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Improved Turbine Wheel.

Turbine wheels have been made to give out more power, in proportion to the water used, than the best over-shot or breast wheels under any circumstances. The conditions, however, under which those results were obtained, were in every possible way the most favorable. The most indispensable conditions are a gate wide open, and a load just adapted to the wheel. In no other way have high results been obtained. If the gate is opened only enough to use one-half the capacity of the wheel, or if by reason of drouth, or a severe frost in winter, the supply of water is reduced in proportion, the power is greatly reduced, and the more the gate is shut the worse the result in proportion to the water used. Hence these wheels are only adapted to constant streams of water. The contrary is the case with bucket wheels, the breast, and over-shot. These motors can be overloaded with work and water, or water without work. Turbines cannot be overloaded with water, though they can be with work. The less water is applied to bucket wheels the more work in proportion. In fact, they are contraries in every thing, except that both give good results, if properly used. Turbines give just as good results under water as out of it. Bucket wheels give good results only out of water. It is claimed that the turbine here illustrated has the most essential advantages of the turbines heretofore designed, and also of the best bucket wheels in use, viz: they will run equally well in or out of water; consequently back water does not trouble them, except to reduce the head of water. They economize any stream of water, however small, in time of drouth, as well as any bucket wheel ever made. In fact, no advantage can be named in other wheels which is not found in this. It is claimed to be the best made and most durable wheel in the market, and can be regulated with the ease and quickness of a Corliss engine. The step never gets out of order, and it is less liable to obstructions by leaves, or anchor ice, than any other turbine. These wheels are set in iron or wood flumes, according to locality or choice of purchaser. The illustrations shows the wheel ready for use, and also the details. The details are as follows:

Fig. 1

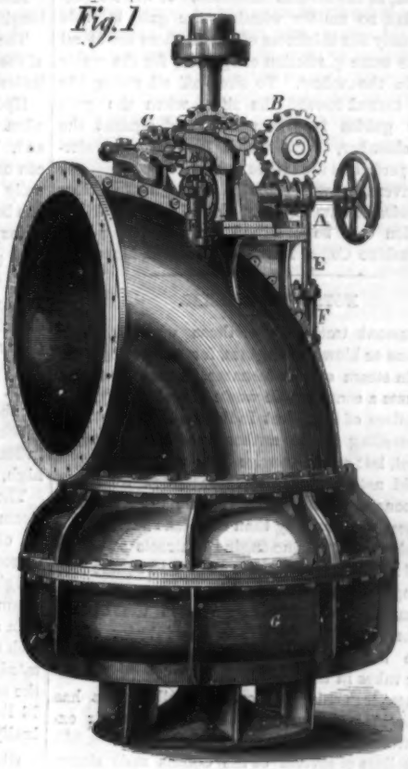
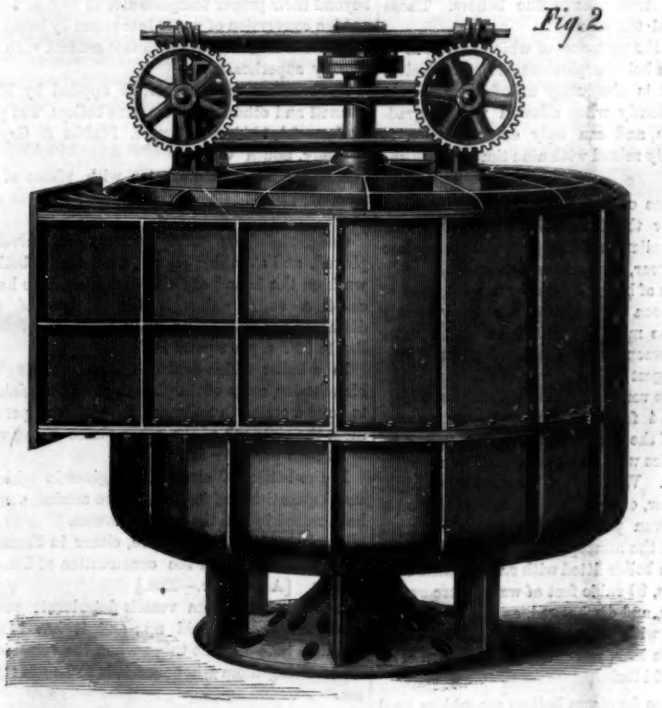


Fig. 2



SWAIN'S TURBINE WHEEL.

The perspective views, Figs. 1 and 2, show the external arrangement for raising the gate. This is a worm wheel, A, carried in suitable bearings, working a wheel, B, on the shaft of which there is a pinion, C, gearing into a rack, D, on the end of the gate rod, E, which passes through the stuffing box, F. The wheel and gate are contained in the case, G, and are shown in detail in the engravings below the principal ones. In these, Fig. 3 shows the wheel chamber, H, with the step, I, and gate, J, in place. The latter, it will be seen, surrounds the gate chamber and has 3 guides which keep it straight and true while rising. The wheel and cover are shown in Fig. 4, and the annular space, K, is allowed for the ends of the gate guides to rise into. In Fig. 5, the wheel is shown, as also the slots, L, through which the gate guides, L, (Fig. 6) pass; the lower band is removed in order to illustrate the form of the back as nearly as possible.

Fig. 3.

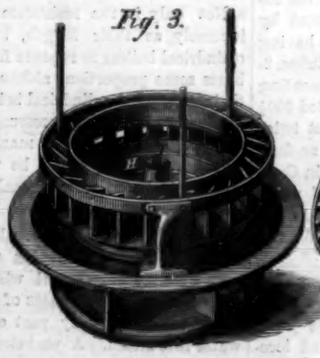
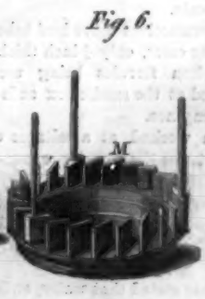


Fig. 4.

Fig. 5.

Fig. 6.



The operation of the turbine is as follows:—the

flume, A, containing the turbine, is supposed to be kept constantly filled with water, in such mass as to maintain an equal pressure upon all sides, and in every chute of the gate, E. Now turn the wheel, A, to the left, and the gate, E, with guides, G G, will be moved downward, out of and from the slotted chamber, H, thus making a small but perfectly contracted opening all around the wheel; the water thus impinging on the float, Q, at its top edge, and immediately under the upper rim, P, of the wheel, K. Now if this thin stream or streams of water could pass vertically down, after the first impulse, no more power would be taken from the water. To prevent this loss of power the floats, G G, are carried backward so as to receive the water in its downward passage, continually changing its direction from a horizontal to a vertical motion, at the point of leaving the float. It will be perceived that the direction of the floats is very gradually and gently changed from a vertical to nearly a horizontal direction. The direction of the water is changed in the same proportion, in the reverse direction. It will be perceived that, no matter whether the gate is wide open, or only the thickness of paper, there are at all points the same perfection of opening for the water to pass in the wheel. To shut off all water the wheel is turned toward the right, when the gate with its guides is drawn into and against the slotted chamber, with which it forms a water-joint, as perfect as the lathes can make it.

This invention was patented through the Scientific American Patent Agency, May 15, 1860. Further information can be obtained by addressing the Swain Turbine Co., at North Chelmsford, Mass.

NOTES ON BOILERS.

The current testimony of those who have employed fans or blowing engines, for promoting combustion in steam engine furnaces, is, that the forced draft causes a considerable waste of coal.

The boilers of the West India Royal Mail steamships, according to the authority of Mr. Pitcher, of Northfleet, last on an average but six years.

The old notion that the three-legged tea-kettle boiled soonest was correct, because the legs conducted heat more rapidly than the plane surface.

The Admiralty marine-engine contracts stipulate for ·68 of a square foot of grate and for 18 square feet of heating surface per nominal horse-power.

Gum catechu is extensively used in the United States for removing scale from the interior of locomotive boilers. It is found not to injure the boiler or tubes in the least.

The heat-transmitting power of boiler tubes has been considerably increased by cutting their exterior surfaces into ridges like screw threads.

The boilers of several of the Collins mail steamships had two grates superposed, one above the other, in the same furnace. [So have a dozen other American ships to-day.—EDS. SCI. AM.]

The Giffard injector will commence working, throwing a jet of water into a locomotive boiler, when the pressure of steam is so low as to be incapable of blowing the whistle. It will often start when the steam-gage pointer stands at zero, although, of course, in such case, the gage cannot be correct in its indications. Few high-pressure gages, indeed, can be depended upon, to a pound or so, at the commencement of the scale.

Many American locomotives have iron tube plates $\frac{5}{16}$-inch and, in some cases, only $\frac{1}{4}$-inch thick at the fire box end, cast-iron ferrules being used. No ferrules are ever used at the smoke-box ends of the tubes in American engines.

Boilers are often worked at a saltness of four thirty-thirds, or at twice the density commonly regarded as safe.

Feed-water heating apparatus has been suddenly and violently collapsed on the sudden admission of cold water while the exhaust steam was passing through.

Professor Miller has stated that water, entirely deprived of air, may be heated in the open air to 360 deg. before boiling, and that ebullition is then explosive.

The late Mr. J. U. Rastrick once cast some iron cylinders 8 feet in diameter and 8 feet long, wherewith to construct a cast-iron high-pressure steam boiler. After a thunder storm these cylinders cracked, with a loud report, from end to end. Mr. Rastrick was disposed to attribute this result to the fact that the castings were made, without mixture, from a single brand of iron, and he afterward cast similar cylinders from mixed irons, and with complete success.

The whole ordinary pressure upon all the internal surfaces of a locomotive boiler of the largest class (including the tubes) is about 15,000 tuns.

In some experiments recorded in Mr. D. K. Clark's "Recent Practice," it appeared that a single-riveted seam in $\frac{1}{4}$-inch plates was only 40 per cent as strong as the whole plate, or 20 per cent as strong as a solid plate 1 inch thick; a similar seam of $\frac{7}{16}$-inch plate was 50 per cent as strong as the whole plate, or nearly 22 per cent as strong as a solid plate 1 inch thick, while a similar seam of $\frac{1}{2}$-inch iron had 60 per cent of the strength of the whole plate, or 22$\frac{1}{2}$ per cent of the strength of a solid 1-inch plate, the $\frac{1}{2}$-inch iron, when riveted, being actually stronger than $\frac{1}{4}$-inch iron similarly riveted!

Messrs. Beyer, Peacock & Co., frequently weld the longitudinal seams of their locomotive boilers.

The earlier Cunard steamships, with the exception of the *Persia* and *Arabia*, have flue boilers. These boilers have lasted ten years.

Hydrogen gas, the presence of which has been so often suggested in boiler explosions, is not explosive, and, by itself, it is absolutely uninflammable. It can only burn silently when allowed to mix gradually with oxygen, and can only explode when it has been previously mixed with nine times its weight of oxygen.

In the experience of the officers of the Manchester Association for the Prevention of Steam Boiler Explosions, one boiler in eight is found to become defective, every year, from corrosion alone.

In several cases of boiler explosion the contents of the boiler have been observed to rise in a cloudy mist, showing the minute subdivision of the water by the disengagement of its contained steam.

Some of the largest boilers in use in the iron works in Staffordshire are vertical, 10 feet in diameter, 30 feet high, and have a 4 feet flue from top to bottom.

The pressure of the air upon the safety valves of steam boilers varies with the pressure of the air upon all other objects. When the barometer is high, therefore, a boiler, of which the safety valve is weighed to a given pressure, will work stronger steam than when the atmospheric pressure is lower.

In a locomotive boiler fitted with one of Baillie's 12-inch safety valves, 80 cubic feet of water were evaporated in one hour, and discharged, as steam, through the safety valve without raising the pressure above 76 lbs. per square inch, the valve having been originally loaded to 64 lbs.

Glass gage tubes for steam boilers are seldom used in the United States. Gage cocks are still relied upon, and occasionally as many as seven are applied at different levels to a locomotive boiler. [An absurd statement: the *law* requires a glass gage to be on every boiler.—EDS. SCI. AM.]

Iron plates taken from a boiler which had exploded after fifteen years' use have been tested to a strength of 27 tuns per square inch.

A remarkable proportion of evaporation to the extent of heating surface employed was reported by Mr. Daniel Gooch, in 1845. The engine *Ixion*, having 97 square feet of fire-box surface and 135 tubes, 2-inch diameter and 10 feet 3 inches long, presenting 724 square feet of exterior surface, evaporated 200$\frac{1}{2}$ cubic feet of water per hour. This is about twice the usual evaporation per unit of heating surface.

Many of the cylindrical boilers employed in Cornwall weigh one tun for each cubic foot of water evaporated per hour; a boiler working up to 100 indicated horse-power (evaporating 50 cubic feet hourly) weighing 50 tuns.

The steam jet was applied by Mr. Goldsworthy Gurney, in 1824, to increase the draft in steamboat chimneys. In 1826, Mr. Gurney applied the jet to increase the draft in the chimney of his road locomotive. Trevithick had discharged the waste steam up the chimney of his locomotive (but not as a jet) as early as 1804.

Boiler scale has been successfully removed in the following manner:—One door of the boiler is taken off. A steam pipe containing highly superheated steam is introduced; the steam acting upon the saline deposit on the surface of the tubes, and other parts of the boiler, expands and disengages it from the several parts. After this the boiler is again filled with water, and steam got up in the usual manner, and kept up for a few hours, and on afterward blowing off the boilers they are found to be as free from scale as when first made.

A "cup surface boiler," with an ingenious provision for securing the circulation of the water in the cups, was patented by Jacob Perkins in July, 1831. The cups were applied, as was stated, for the purpose of increasing the heating surface.

In the flue plates of American boilers internal flanges are turned on the plate for tubes as small as 5 inches in diameter—a test which only very tough iron would bear.

With large and heavily worked engines there is a disturbance of the pressure in the boiler at every stroke of the piston. A sensitive steam gage will always show this to be the case.

In many cases there is a sudden increase of pressure in steam boilers immediately after starting the engine. This occurs, no doubt, from the ascent of water upon some of the plates which have been heated beyond their proper temperature, as well as from the sudden conversion of water into steam by being raised in a divided state into intimate contact with steam already superheated.

The combustion chamber, as applied by Mr. McConnell and others to locomotive boilers, was patented June 2d, 1846, by Messrs. Stubbs & Grylls, of Llanelly, South Wales.

A boiler, 3 feet in diameter, with plates of $\frac{1}{2}$-inch iron, will burst at a pressure of 708 lbs. per square inch.

Cast-iron boilers were formerly extensively employed, and at the present time many boilers at work on the island of Cuba and elsewhere have flat cast-iron ends, although the boilers of 42-inch diameter are worked under a pressure of from 60 lbs. to 80 lbs. per square inch.

In a boiler which exploded at the Atlas Works, Manchester, some of the plates were afterwards found to have a strength no more than 4$\frac{1}{2}$ tuns per square inch, the strength of the other plates being upward of 20 tuns per square inch.

In the boilers of steam fire engines in which only small quantities of feed water are carried, steam has been raised in less than four minutes.

Angle iron is not employed, either in France or in the United States, in the construction of locomotive boilers. [A mistake.—EDS.]

Iron tubes in steam vessels deteriorate very fast when the vessel is laid up; and it has been proposed to take out the tubes when the vessel is taken in, resetting them whenever it is to be got ready for sea.

The seventh division of James Watt's patent of 28th of April, 1784, describes a steam carriage intended probably for common roads. The boiler was to be of wood, strongly hooped to prevent bursting, and having an internal metal vessel containing the fire.

The application of felt to the outside of marine boilers has been sometimes found to accelerate their internal corrosion.

Not only is the resistance of tubes to collapse inversely as their length, but the resistance of cylindrical boilers to rupture from internal pressures bears some proportion, although contrary to that of their length. A cylindrical boiler, when subjected to gradually increasing pressure, yields first at the middle. It is believed by many that the strength of cylindrical boilers would be very considerably increased if hoops were shrunk at intervals around them.

As bearing upon the probability of steam boiler explosions by the admission of water upon heated iron, a simple experiment will show that the heat contained in a given mass of red-hot iron is insufficient to convert any part of its own weight of water into steam. A pint claret bottle may, when filled with cold water, be safely held in the hand while a red-hot poker is thrust into it. If care is taken to keep the hot iron from actual contact with the glass, the bottle will not be cracked, and there will be no disengagement of steam.

It is a somewhat remarkable fact that the boilers of sea-going steam vessels very seldom explode,

Considering their number, their size, their continuous working for many days together, and their liability to incrustations, such boilers might be expected to explode frequently. [It is not at all singular; it is because they are taken care of.—EDS.]

In some of the locomotive boilers made by Mr. Allan, of the Scottish Central Railway, the fire box is a cylindrical continuation of the barrel of the boiler, and is wholly surrounded by a water space with the exception of an opening, like a man-hole, for the admission of air to the internal grate.

Dr. Ernst Alban at one time worked a steam engine, in London, to a pressure of 1,000 lbs. to the square inch.

Steam boilers constructed of wood were at one time employed to some extent.

Professor Rankine estimated the evaporation of water, per pound of coal, in the boilers of the steamer *Thetis* as 13·78 lbs.

In a discussion on steam boilers at the Institution of Mechanical Engineers, Mr. D. Adamson stated that he knew of many boilers 7 feet in diameter working at 100 lbs. pressure, and one of that size was worked at 150 lbs. [How thick were the plates?—EDS.]

The Giffard injector, when supplied with steam of 25 lbs. per square inch from one boiler, has forced water into another boiler against a pressure of 48 lbs. per square inch.—*Engineering.*

OUR SPECIAL CORRESPONDENCE.

ORE HILL, SALISBURY, CONN.,
July 21, 1866.

The way the famous Salisbury charcoal iron is mined, and the way it is made.

Near the western edge of the town of Salisbury, Conn., about one mile from the New York State line, is the Old Bed of hematite iron ore, from which, when smelted with charcoal, iron is made equal in quality to any produced in the world. This excellence is doubtless owing to the absence of sulphur, phosphorus, and other impurities in the ore; and the advantage of charcoal, as a reducing agent, is its freedom from these impurities, which are generally present in mineral coal. The mine resembles a very extensive railroad excavation, excepting that it is crooked and irregular, and the mass of earth which has been drawn out of it is piled in scattered mounds around it. It is about eighty feet in depth, and the town road passes right through it, though not in the deepest part, following the winding cart paths up which the waste earth is drawn. The deposit above is mica slate, in an advanced stage of decomposition, and the ore occurs in seams or beds dipping to the southeast, at an angle of about fifty degrees. The beds range in thickness from that of a knife blade to twenty or twenty-five feet, and the ore is so brittle that most of it may be dug by the pick, though considerable blasting is required. Three-fourths of the labor is expended in removing the superincumbent mica slate and clay, which are hauled up steep paths in one and two-horse carts, and dumped in irregular piles around the sides of the pit. The large lumps of ore are thrown directly into wagons and hauled away to the furnaces, but the small fragments are passed through a washing machine to free them from the earth with which they are mingled.

The washing machine is a revolving cylinder about 4½ feet in diameter and 6 feet in length, formed of cast-iron staves with wrought-iron hoops. Each alternate stave is perforated with quarter-inch holes for the escape of a portion of the water, and all the staves are armed upon the inner side with broad teeth cast on them, and arranged spirally so as to tumble the ore through the cylinder and out at the end opposite to that at which it enters. Water, raised from the bottom of the pit by a steam pump, flows down a steep trough into the cylinder; and into this trough the small fragments of ore are dumped from the carts. The cylinder receives a slow rotary motion from horse-power—three horses being required for the work. The water, with the waste earth, flows from the cylinder through a long trough, at the lower end of which a workman is constantly employed in shoveling away the deposit.

The mine is owned by an incorporated joint-stock company, with a nominal capital of $40,000, though its actual value is several times this amount, as the annual revenue is in the neighborhood of $30,000. The furnace men pay the proprietors $2 per tun for the ore in the bed; they then pay $2 75 per tun for digging, and from $1 upward for hauling, according to their distance from the mine. The mine has been worked for more than a hundred years. The ore at first was transported in leather bags on horseback to Sheffield, where it was made into wrought iron by the direct process, without passing through the state of cast iron. Mr. Peter P. Everts, the agent of the proprietors, tells me that some of the Salisbury mines make very inferior iron—only this particular bed enjoying the reputation of the very best quality among those who understand the matter. He says also, that this iron—both cast and wrought—shrinks much more in cooling than most qualities, but that the cast iron is less fluid and does not make so sharp castings as some inferior metal.

It is owing to the steepness of the hill sides in this region that charcoal can be used here for smelting iron; the hills, being too steep for cultivation, are given up to the growth of wood, from which the charcoal is made. About a mile from this place is the Phenix Furnace, which is one of the vast and varied possessions of C. T. Maltby, a self-made millionaire, of New Haven. In the neatness and perfection of its arrangements it is a model establishment, and it is supplied with both ore and limestone from a mine and quarry directly by its side. It is 32 feet in hight, 9 feet in diameter at the boshes, and 4 feet at the top, built of stone and lined with fire-brick 9 inches in thickness. The "founder," Mr. Horace Harris, is a Massachusetts man, and he was brought up to the trade by his father.

Long before chemists had learned that carbon will, at the proper temperature, take oxygen from any other element, practical iron workers had discovered that by heating iron ore in contact with coal they were able to obtain metallic iron. Hematite is a combination of oxide of iron ($Fe_2 O_3$) and water, in the proportion of 80 lbs. of oxide of iron to 9 lbs. of water. This combination is a brittle substance, neither malleable nor ductile, nor possessing any of the peculiar properties of metals. The object of smelting is to remove the oxygen and to retain the iron in a pure metallic form. This is effected by heating the ore in contact with some form of carbon, either charcoal, anthracite, or coke. As 1-10,000th part of either phosphorus or sulphur materially impairs the quality of the iron, and as anthracite and coke are rarely, if ever, free from these impurities, the best quality of iron is obtained only by smelting with charcoal.

The process, as practiced at Mr. Maltby's Phenix Furnace, is as follows: The furnace is first filled with charcoal, which is set on fire. Then a charge of ore and limestone is introduced at the top. As the coal is burned out the charges are renewed, from 40 to 45 being introduced in the course of 24 hours. Each charge consists of 25 bushels of coal, 200 lbs. of limestone, and from 1,200 to 1,500 lbs. of ore. The quantity of ore is varied to adjust the temperature, as on this depends the hardness of the iron produced. The ore gives up its oxygen, which combines with the carbon of the coal, forming carbonic acid—a gas that floats away in the atmosphere. At the same time the iron absorbs a small quantity of carbon, becoming, by this process, cast iron, with a melting point far below that of pure iron. The hotter the furnace the smaller is the quantity of carbon absorbed, and the softer is the cast iron produced. The iron is numbered from 1 to 6, according to its hardness, with an intermediate half number between 4 and 5. This intermediate number, 4½, is suitable for car wheels.

The fire is urged by a powerful blast of hot air, the air being heated by the waste heat in the top of the furnace; the waste heat is also used for generating steam for driving the blowers. The blowers are two wooden cylinders, furnished with pistons like those of steam-engine cylinders. These cylinders are each 5 feet in diameter, with 5-feet stroke. They are formed of inch plank sawed out in pieces like fellies, and are lined with veneering, the grain of which is laid longitudinally. The heads are of cast iron, and they are held together by iron bolts extending from one to the other, outside the cylinder. These cylinders are laid horizontally, and to prevent the weight of the piston from wearing them on the lower side, the piston rod is extended through the head and supported by a yoke running in greased ways. These wooden cylinders have been in use 13 years, and are still in good condition, but Mr. Harris thinks iron is much the most suitable material for this use. To prevent the force of the blast from varying with the varying velocity of every stroke, the air is blown into a regulator, which is simply a cylinder like those of the blowers, set upright, and with the upper head loose like a piston, and loaded to the requisite pressure. The pressure of the blast is about 1½ pounds to the square inch; it is measured by a siphon gage placed in plain sight of the engineer.

The air is heated after it leaves the blowers by passing through a series of cast-iron pipes, of siphon form, set in the furnace chimney above the point at which the coal, ore, and lime are introduced. The temperature desired is about 600 deg.; and the founder at this furnace employs two tests to measure the temperature. As lead melts at 612 deg. this affords a convenient test for that temperature; and a still more convenient is the kindling of a stick of pine wood. Mr. Harris says that he does not suppose, in still air, a stick of pine would take fire at 600 deg., but, in the powerful blast from these tweers, he was taught by his father to regard it as a trustworthy test.

The furnace is kept in constant operation night and day, and once in eight hours it is tapped at the bottom, and the molten metal is drawn out and run into pigs—from 3 to 3½ tuns of iron being obtained at a casting. The present price of the best Salisbury iron is $70 per tun. Mr. Maltby is holding heavy stocks of cast iron—variously stated at from $150,000 to $300,000 worth—and it is said that most of the furnace men in the region are also holding largely in hopes of still higher prices, notwithstanding the inflated condition of the currency.

The lime used in smelting iron is employed as a flux. It combines with the silica of the iron ore, forming a silicate which is fusible at the temperature of the furnace, and which consequently melts and runs out of the way, thus allowing the several globules of molten iron to run together and flow down to the bottom of the furnace. Innumerable other chemical changes go on in the interior of a smelting furnace, among the many impurities of iron ore with the fuel and flux, at the high temperature that obtains, but those stated are the principal and essential ones.

G. B.

Casting of a Twenty-inch Cannon.

Another twenty-inch gun was recently cast at the Fort Pitt Iron Works, Pittsburg, Pa., being the third one of that size. This is the first naval gun, however, and is intended for the *Puritan*, consort of the *Dictator*, both ocean monitors. The two previously cast were army guns. They are Rodman guns, that is, cast with a water-cooled core.

The quantity of metal melted at once was enormous; not less than 140,000 pounds, and three furnaces were in use to accomplish it in time, the fires being started at 4.30 A. M. on the morning of pouring. The iron was in the following proportion: 101,000 Juniata, second fusion; 39,000 Juniata pig, from the Bloomfield Furnace; this is stated to be the finest quality of metal, for gun founding, in the country. The furnaces were tapped at 12.10, and the mold was filled in a short time.

The length of the rough casting is 236 inches. The maximum diameter is 65½ inches, and the minimum 48 inches. When finished, the breech of the gun will measure 64 inches in diameter, and the nozzle 35½ inches. The length of the cylinder bore is 147 inches, depth of chamber 10 inches. The thickness of metal outside the bore, at the breech, is 22 inches, and at the nozzle 7 9-10 inches. Diameter of trunnion 18 inches. At 9.20 Sunday morning the water was turned off, at which the temperature was 97 deg. The core barrel was hoisted, when it came out perfectly clean, there being every indication of perfect success in the casting. After the barrel was hoisted out, a very small stream of water was allowed to flow into the bore, when it immediately became steam. This was to be continued until 8 o'clock, when a column of cold air would be forced in, and the cooling process completed in this way.

FOREIGN SCIENTIFIC NEWS.

[From our own Correspondent.]

LONDON, Friday, July 20, 1866.

The *Great Eastern*, with the Atlantic cable on board, had, up to last night, laid 811·14 miles of the line, and the position of the ship is given as lat. 51 54 N., long. 29 39 W., and 712·9 miles from Valentia. Signals good.

At Valentia, and at Heart's Content, in Newfoundland, stations have been erected by the Atlantic Telegraph Company, with a pillar of solid masonry in the center of each. These pillars are to support the receiving instruments—Professor Thomson's reflecting galvanometers—which are now made so sensitive that the mirror and magnet together weigh but three grains, and it is therefore necessary to place the apparatus where it will be safe from the slightest vibration. To secure the cable from the effects of lightning, the contact with the earth will be made several miles out at sea, by means of a length of old cable with a lump of lead cast on the further end, which will be laid from each telegraph station, and the conducting wire used as an earth line. The instruments for sending messages through the cable were recently invented by Mr. Cromwell F. Varley, and Professor William Thomson. The apparatus is the result of a long series of investigations to determine the laws which govern the passage of currents of electricity through long cables, and the method adopted is to send no less than five weak currents of varying length into the cable at one end to produce one single deflection of the needle at the other. The time of each pulsation is carefully calculated in accordance with known laws, and the result is, that one signal having been sent, the cable is left at once in nearly a neutral state, so as to be ready for the immediate transmission of another. Professor Thomson accompanies the expedition as consulting electrician, and is only to be appealed to in moments of difficulty. The signals between the ship and shore will remain in the hands of Mr. W. Smith, who, as electrician to the manufacturers, has necessarily gained much experience in laying cables. Mr. C. F. Varley, one of the cleverest electricians in this country, who, for many years, has had charge of the wires of the largest telegraph company in England, also acts as consulting electrician, but is separated from his colleague, Professor Thomson, to watch the signals from Valentia, and to test the line should faults occur. Mr. Cyrus Field is on board the *Great Eastern*, but nobody else of importance. The rest of the expedition consists of the crew and officers, the staff of the contractors, and two or three of the directors. These directors, or their colleagues, made the expedition a private one, and last year sent the American reporters back from London to New York, without any apology for the trouble and the time they had wasted in the attempt to obtain a passage in the *Great Eastern*. General ungentlemanly behavior and the secrecy hanging over the operations of the company, have, in this country, caused much coolness respecting what in itself is a noble undertaking. The shares of all the companies connected with the undertaking are still at a discount in the London market. Out of the 9,000 miles of deep-sea cables that have been laid, less than 850 are at work, and some of these are faulty. Shallow-sea cables are continually breaking and undergoing repairs, and for this reason the prospect of maintaining an Atlantic cable in working order is not very bright. The North Atlantic route is again attracting attention here. A company is in existence, intending, if possible, to carry out the scheme, but the names of the directors have not yet been published.

Mr. Balfour Stewart, F.R.S., Superintendent of the Observatory of the British Association at Kew, is now conducting a series of curious experiments. A disk, when made to rotate rapidly in vacuo, becomes slightly heated, as proved by the aid of a thermo-electric pile connected with a reflecting galvanometer. By very ingenious apparatus, he causes a disk of aluminum to rotate rapidly in vacuo, and so eliminates all sources of error as to prove that the heating arises from some causes as yet unknown to men of science. He believes that he has at last brought the hypothetical substance, ether, within the range of direct experiment, and that the heating effect arises in some way from its vibrations.

A large body of archæologists have this week invaded London to rummage all its old buildings, charters, and antiquities. The Lord Mayor, as chief magistrate of the city, received them with open arms, and the Queen has given them permission to explore Windsor Castle to-morrow from turret to basement. Last Wednesday they visited Waltham Abbey, a building whose origin is lost in the mists of ages. Legends tell how, in the time of King Canute, a country gentleman, who rejoiced in the unromantic name of "Tovey," and was known to his neighbors as "Tovey the Proud," had a miraculous cross dug up on his estates in Somersetshire. The cross was placed on a cart, to which were yoked four oxen, and then the sacred relic was asked if it would like to be taken to Glastonbury or Canterbury. It made no sign, till Tovey chanced to mention Waltham, where he had estates, and directly the name was spoken, off trotted the oxen. So was the Holy Rood first established at Waltham. The surrounding country was wild forest, but Tovey proved himself a root and branch reformer, for having founded his church he established a parish also, by planting fifty families upon the spot to worship therein. King Harold, in 1062, built an abbey upon Tovey's foundation, and established therein a dean and twelve secular canons. Portions of Harold's work are still visible. In later years he died, and was buried within the walls of the now venerable minster.

On Wednesday also, Sir John Lubbock, Bart., gave an inaugural address to the Archæological Institute, on "The Study of Primæval Archæology." In Western Europe he recognized four distinct pre-historic periods, namely, Palæolithic or Early Stone Age; the Neolithic or Later Stone; the Bronze Age, and the Age of Iron. Of the earliest of these periods he said that its antiquities are found in beds of gravel or loam, which extend along our valleys, and reach sometimes 200 feet above the present water level. These beds were deposited by the existing rivers, which, moreover, drained the same areas as at present. The fauna of that period comprised other than animals now existing—for instance, the mammoth, the woolly-haired rhinoceros, the hippopotamus major, and the musk ox, then lived. The climate was much colder than at present, yet man, he said, already inhabited Western Europe, and used rough implements of stone, none of which were polished. Pottery and the use of metals were unknown. The people could draw, and the representation of a mammoth on a plate of fossil ivory, found by M. Lartet at La Madelaine, and was exhibited as a specimen. Sir John Lubbock is President of the Entomological Society, Vice-Presidentof the Ethnological and Linnæan Societies, and a Fellow of the Royal, the Geological, and the Society of Antiquaries.

Photography and the Kaleidoscope.

About a couple of years ago, a writer in an excellent transatlantic cotemporary, the SCIENTIFIC AMERICAN, remarked, "Let the photographer once combine the kaleidoscope with the camera, and then see with what ease and rapidity he can produce the most charming designs for dress goods, tapestry, oil-cloth, wall-paper, and numerous other purposes. Such a thing is possible." Almost at the same moment that the American writer stated this, M. l'Abbé Laborde brought under the attention of the French Photographic Society a method which he had adopted to effect the preservation, by photography, of the changeful designs of the kaleidoscope. As a means of preserving patterns for a variety of decorative purposes, this application of photography is deserving of attention, and it may be interesting here to quote from the communication of M. l'Abbé Laborde on the subject. It is worthy of remark, that the method of throwing the designs of the kaleidoscope on a screen by the aid of the magic lantern has since been adopted and exhibited at the Polytechnic Institution:—

"The variety of designs presented by the kaleidoscope, when turned round, is familiarly known to every one, yet we are often surprised at the appearance of very curious and unexpected forms which we see disappear with regret.

"The regular figures which result are depicted on the ground glass of the camera of long focus, and the images are focussed direct without being reflected; this portion is naturally more lighted than the others. It requires several minutes of exposure to obtain a picture on the collodioned plate. We cannot focus the portions of the image which are several times reflected, for they appear in the objective as if they came from greater distance—they lack distinctness, and they also exhibit the defect of planitude in the mirrors.

"Notwithstanding these imperfections, I believe I have attained the aim I proposed to myself, which is, to place before the eyes of those who are occupied with stained glass, paper hangings, and other kinds of ornamentation, very varied patterns, which photography can supply by the hundred.

"I cannot pass over in silence another application of this instrument, although it is in some measure foreign to photography. On the surface of a disk of glass I glue a host of black objects, such as paper patterns, small leaves, mosses, lichens, etc., and place them as near as possible to the external end of the kaleidoscope and, by a mechanism which it is unnecessary to describe, I make the disk turn slowly, and thus present them successively to the inclined mirrors; we then perceive a series of changing figures depicted upon the ground glass, among which we can select those best suited to be fixed by photography.

"In a room completely darkened, we can project the images upon a stretched canvas, which will admit of their being seen by many persons at the same time. We must then bring the kaleidoscope nearer to the objective, in order to increase the dimensions and distance of the images, and illuminate the disk by a strong light; in a word, it is a magic lantern, in which we replace the painted slides by a kaleidoscope. If, instead of objects glued upon the glass, we apply various tints mingled, and thrown haphazard upon the surface of the disk, the figures receive the colors, and their unexpected evolutions are very pleasing to the sight."—*Photographic News.*

Photographing a Volcano.

Among the most interesting of the contributions at the recent exhibition soirée of the London Photographic Society were some cabinet pictures, by Mr. Moens, of recent eruptions of Etna, taken so near the spot that the tripod had to be more than once hastily removed to escape the flow of the burning lava. Views of the new volcanic islands, which have lately risen in the Grecian Archipelago, were also presented.

The Prussian Army.

A letter from a gentleman in Stettin, Prussia, to a relative in Mobile, Alabama, states that: "We have now ten army corps, including the Guards. Each corps has ten regiments of infantry of the line, and each of these regiments consists of three battalions of 1,013 men each, amounting to 308,900. To these add ten regiments (Landwehr) of reserves of the first call, and ten of the reserves of the second call, for each army corps—amounting to 607,800 men—and we have a total of 911,700 infantry.

"For artillery, cavalry, chasseurs, sharpshooters, pioneers, etc., add one-third of the above, and we have a grand total of 1,215,600 men, all good soldiers."

If these estimates are correct, the Prussians have a much larger force than has been generally believed in this country, and it must be considered that this vast army is not composed of undisciplined conscripts, but of well drilled and efficient soldiers.

Power of Lightning.

While on a visit a few days since to the old town of Litchfield, Conn., we were shown, in the outskirts of the village, an example of the power of lightning.

Near the roadside, in an open pasture, once stood a fine old chestnut tree. It was about as large as such trees ordinarily grow. A few days since a bolt of lightning shot down through its branches, riving the tree into thousands of pieces and scattering them in a circle at a considerable distance from the trunk, of which but a small stump remained. We have frequently seen trees that had been struck by lightning, but never before saw one so completely riddled to pieces. During the past few weeks we have reports of several houses furnished with rods, that were struck and badly damaged.

UNIVERSITY OF MICHIGAN

THUNDER STORMS—PROTECTION AGAINST LIGHTNING.

The present summer, so far, has been remarkable for the number of accidents from discharges of electricity. We believe there has been no storm this season, accompanied with lightning, which has not resulted in damage to person or property. In view of these facts, the importance of providing adequate protection to buildings and ships, from lightning, can hardly be over-estimated. The failure of lightning rods, in some instances, to protect the structure to which they were attached, has had the effect to impair confidence in such means of protection; but it can be clearly demonstrated that when made on scientific principles, honestly constructed, and properly applied, they are the only means which can be relied upon for protection, and that they are deserving of entire confidence.

The electric fluid does not always descend in a vertical path, nor in a course approaching that direction. Many instances are on record where the bolt traveled horizontally, and much damage has occurred from "earth strokes" or ascending discharges. These facts have not always been recognized by constructors of lightning rods, their idea being that a building was sufficiently insured against lightning by having the rods project above the highest portion of the building, leaving all the other parts unprotected. Experience has added its evidence to the instructions of science in demonstrating the unreliability of such protectors.

From Lyon's "Treatise on Lightning Conductors," we copy the following requisites of a good rod:—

"First. The conductor should be made of good conducting substance.

"Second. It should have great electrical capacities; a square rod requires less metal than a round rod.

"Third. It should be perfectly continuous, *i. e.*, it should have no breaks in the connections—no links or hooks, but a perfect metallic union of every part.

"Fourth. It should be insulated from the building to be protected, except from such masses of metal as are likely to offer other lines of discharge.

"Fifth. It should have numerous lateral points, one in six or seven feet will answer. The more numerous these points are, the greater the conducting power of the rod. Besides, these lateral points provide for an oblique discharge, each being as good a receiving point as the higher point at the chimney or other prominences. They also guard against a lateral explosion, or a division of the charge, which is liable to happen in case the rod is overcharged, especially if it be fastened to the house with pointed staples; and in case of an upward stroke, the electric fluid being discharged at so many different points, no harm can possibly occur.

"Sixth. Its upper extremity should project freely into the air, should be pointed, and may be triangular, somewhat similar to a bayonet, or it may have several branches. The only scientific advantage in having a branching head or point for the superior termination, is this: all points are not likely to become blunt at the same time. Some have supposed that the point should be *magnetized;* and little needles, called "*magnets*," have sometimes been added. But it is difficult to see the practicability of this recent discovery; for most are aware that magnetized iron or steel soon loses its magnetic influence. But *is* there any truth or science in this application of magnetism? If there *is*, we confess that we have not been able to discover it in any experiments in the laboratory; neither can we learn that the subject has even been *mentioned* by any writer *whatever*, on the subject of electricity.

"Seventh. The upper termination should be plated with silver or gold, to prevent corrosion.

"Eighth. Every branch rod running to chimneys, and other prominences, should have a perfect metallic union with the main rod.

"Ninth. In cases where metallic vane spindles, or other points exist, the conductor may commence from these, and should be applied immediately to the part to be protected, and not at a distance from it; and should be so applied that a discharge of lightning falling on the general mass could not possibly find its way to the ground through the building by any circuit of which the conductor did not form a part; that is to say, the conductor should be so carried over the several parts of the building, that the discharge could not fall upon it without being transmitted safely by the conductor. Hence, the rod should run along the whole length of the ridge, and down to the ground, at least on two sides of the building. If the building is large, it should run down on each corner.

"Tenth. Every conductor running to the ground should terminate sufficiently beneath the surface to insure moisture in the dryest part of the season. If circumstances permit, it should connect with a spring of water, a drain, or some other conducting channel."

Numerous instances of the ascending stroke have occurred, the records of which are extant. It must be evident that a single rod extending above only one point of the building, will not properly protect the structure to which it is applied from one of these upward strokes, neither is it efficient against an oblique or divided discharge. The whole building, top and sides, must be protected by a continuous rod with numerous projecting points for receiving and discharging the electric fluid. In the summer of 1787, lightning struck two persons near the village of Tacon, in Beaujalois, who had taken refuge under a tree. Their hair was driven upward and found near the top of the tree. A ring of iron which was on the shoe of one of these persons was found suspended on one of the upper branches.

On the 29th of August, 1808, lightning struck a small building near the hospital of Salpétrière, Paris. A laborer who was in it was killed, and after the event, pieces of his hat were found incrusted in the ceiling of the room.

In June, 1854, the dwelling of A. J. Platt, of Deep River, Conn., was struck by lightning, the fluid passing up the door-casing of the hall, knocking off the ceiling in the hall and parlor, and, after traversing the house longitudinally, passing down a pillar, returned to the earth. This building was guarded by a rod attached to each chimney, the branches connected to a single rod passing down the side of the building through glass insulators. In this case it appears that the elevated rod afforded no protection against an upward stroke. The case would probably have been different if the sides of the building had been furnished with conductors with lateral points. Passing the rod through glass insulators does not seem to be always effectual to protect the building. The interposition of a glass knob between the rod and the building, appears to be preferable. In cases where the rod has passed through a hollow cylinder of glass, it has been found that the glass would burst and the fluid enter the building by the iron staple which held the glass ring.

Some of the old-fashioned and erroneous notions entertained and religiously believed by persons in relation to the effects of lightning, and particularly the means of protection, have been exploded by the occurrences of this season. That feathers afford no protection against electricity, is proved by the case of a woman in St. Louis, who was killed by a stroke of lightning while lying on a feather bed. An instance of one of three persons sitting near a closed window, also dispels the illusion that the interposition of window glass is an effectual bar to the action of the destructive element.

The only efficient protection is that of a good rod properly put up. The subject is too important to be lightly passed over, and it is no less important that the confidence of the purchaser should not be betrayed, and life and property endangered, by accepting an inefficient conductor, or one improperly applied.

A LITTLE daughter of Mr. Kennedy, residing in Pittsburg, came near losing her life the other day, by eating a small piece of fly-poisoning paper. Sweet milk was at once administered as an emetic. It had the desired effect, and a physician summoned declared that the child owed its life to this simple remedy.

[White of egg is also beneficial; being an antidote to most poisons.—EDS.

ORDERS have been received at the Springfield Armory, from the Ordnance Department, at Washington, for the manufacture of 25,000 of Allin's lately improved breech-loader, and work on them will soon be commenced.

Correspondence

Breech-Loaders Vs. Muzzle-Loading Fire-arms.

MESSRS. EDITORS:—The great success of the needle gun, in the hands of Prussian soldiers, has awakened a lively interest in favor of breech-loading fire-arms in Europe and in this country.

Inventors and practical armorers have, for years past, been fully aware of the great superiority of the breech-loading system over that of of muzzle-loading, and great efforts have been made to introduce this class of arms into the military service of the different nations of Europe and in this country. To Prussia belongs the credit of first arming its infantry with this class of arms. Better guns, however, than the needle gun, are to be found in the United States. Why they have not been adopted by the Government ere this, is a subject which need not be discussed at this time. The object of the writer is to point out some of the advantages of breach-loading over muzzle-loading arms.

First, A breech-loading carbine, or musket, when metallic cartridges are used, can be loaded and fired a thousand times without cleaning, when it is scarcely possible to load and fire a muzzle-loading musket fifty times without cleaning. This difference grows out of the fact that the principal fouling caused from each discharge of a breech loading arm, is deposited within the cartridge shell, or case, which being removed at each discharge, keeps the gun clean. If a man will take the trouble to load and fire a muzzle-loading gun, say a Springfield musket, fifty times, and then remove the breech-pin, he will find a deposit of burnt powder at the breech where the charge lay, of about one-sixteenth of an inch in thickness. This incrustation is very hard and difficult to be removed. There is none of this deposit at the breech of a breech-loading arm, for the reason as stated; the fouling engendered at each discharge is removed with the spent cartridge case. When a ramrod is used, the fouling is rammed home toward the breech; when in the breech-loading arm what little there is of deposit in and along the barrel, not removed with the case, as stated, is carried forward and out of the gum by each successive discharge.

Second, Greater penetration and range can be had from a breech-loader with same charge, than can be obtained from a muzzle-loader. This favorable result grows out of the fact that in a breech-loading arm, when used with a metallic cartridge, there is no escape of gas at the breech, all the force of the powder being expended in giving velocity to the ball, when in a muzzle-loading arm, there is an escape of gas at the vent at each discharge, which lessens the initial velocity of the ball.

Third, A consideration of the very first importance in favor of breech-loading fire-arms is, that every cartridge must be either discharged or withdrawn from the barrel, precluding the possibility of such results as were shown on the battle field at Gettysburg, where, of the 27,574 muzzle-loading muskets collected after the battle, 24,000, were found loaded; 12,000 of which contained two loads, and 6,000 or 20 per cent were charged with from three to ten loads each, the cartridges often times being loaded without breaking them, and many inserted with the ball downward. What an immense amount of effective force was here rendered useless, and that, too, in the heat of battle when every available means was being exerted to secure victory! What might have been the gain, in the saving of life and of treasure to the nation, had the Union soldiers been armed at the commencement of the rebellion with such arms as the Spencer, Sharpe Remington, Ladely or Peabody breech-loading rifles. With such arms in the hands of the Union soldiers it is but reasonable to suppose that the rebellion would have been crushed within six months from its commencement. It is results that count in warfare. Nothing can be more plain than that those who have the best arms necessarily have a great advantage. It is, therefore, the duty of every nation to prepare in

time of peace, for its own defence, and to do so effectually, it should avail itself of any ascertained improvement as soon as possible.

Fourth, There is still another very important feature in favor of the breech-loading system: viz, the practicability of loading and firing with great rapidity. The Gatling gun, which is a breech-loader, can be loaded and fired at the rate of one hundred shots per minute. Now it is evident that no muzzle-loading arm could be loaded and fired so often. By loading at the breech, the process of loading is simplified—ramrods, wipers, the biting of cartridges, capping, etc.—are all dispensed with.

The prediction may be safely made, that muzzle-loading small arms will, within the next quarter of a century, become as obselete as the flint-lock musket is at the present time.

Breech-loading cannon will, no doubt, in most cases, supersede muzzle-loaders. There is now at the Arsenal, in this city, a breech-loading steel cannon—Broadwell's patent—which has been adopted by the Russian and other Governments of Europe, which can be loaded with great facility, and which has been fired over one thousand times without the escape of gas at the breech, and without injury to the gun. Surely these improvements and results should wake up "red tape" and "old fogyism" to a sense of their duty. There is no necessity for riding in stage coaches when steam cars are at hand. * * *

Washington, D. C., July 26, 1866.

Board Measure.

MESSRS. EDITORS:—Your correspondent, Mr. P. Rhoades, under date of June 10th, after correctly noticing the error in Heber Wells's mode of calculating the quantity of one-inch boards that can be sawed from a log of any given size, gives his mode of calculating the same, viz., "multiply the length of the log, in feet, by half the diameter less 4 inches, and the product by the same number, then divide by 4, and the product will be the amount in 1-inch boards;" but he also says, although the result is correct, he does not know how or why it is so, or in other words, he does not know why he deducts 4 from the diameter of the log, or why he divides by 4. Now by cancellation, the length of the log—in feet—after being squared by taking off the 4 inches, is multiplied by half its diameter in inches and then again by the same number, which is the same as multiplying the length by the square of half the diameter; now, as the square of half the diameter is only one-fourth the square of the diameter, it only requires dividing by 3 instead of 12 to bring it into feet, solid measure, or by 4, as done by Mr. Rhoades, if an allowance is made of one-fourth for saw kerf.

On the same principle of cancellation, Mr. Rhoades would save still more figuring by multiplying the length of the squared log in feet, by the square of one-fourth its diameter, in inches, and dispense with dividing by 4 altogether. This rule will apply to any length log, or a log of any size square, viz., one log 12 feet long, 24 inches in diameter, deduct 4 inches for slabs, and you have a log 20 inches square. The contents will be in 1-inch boards, 300 feet, thus: 12 feet, $24-4=20\div\frac{1}{4}=5\times12=60\times5=300$. But Mr. Rhoades makes a great mistake in taking off 4 inches, indiscriminately, from logs of different sizes, as a 12-inch log is squared by taking off $1\frac{1}{2}$-inch slabs, while a 24-inch log requires a slab of $3\frac{1}{2}$ inches, which leaves a log of 17 inches square. My calculation is made from Mr. Rhoades's estimate, and is intended only to show where he gets the 4 for a divisor.

I have read the remarks of D. W. C. C., in the last number of the SCIENTIFIC AMERICAN, and consider them mathematically correct.

AN OLD LUMBER MEASURER.

Madison, Ind., July 27, 1866.

The Mississippi Levees.

MESSRS. EDITORS:—I see that the levees near New Orleans are causing a great deal of trouble and expense. Why not build them of two rows of piles, laid nicely edge to edge, with a space between, and have them driven to or through the "hard pan." If there is no natural "hard pan" make an artificial one of hydraulic cement grout. Excavate the space between the two rows of piles down to the "hard pan" and fill with a mixture of clay and gravel, well worked together, with a proper quantity of liquid oxide of iron. Proportions, one of clay to two of gravel. Line the piles from the top down two or three feet with plank, to hold them together and stiffen the structure.

Gravel, clay, and timber are on the spot, and the iron scraps, from which to make the liquid oxide, can be brought from all parts of the country, as ballast, in vessels arriving in New Orleans. It could be put into tanks, as wanted, with water and a little acid. If the iron chips could not be easily procured, the mixture of clay, gravel, and water would answer every purpose, except that it would require more time to harden than when mixed with liquid oxide. In such a case I would brace the outside by woodwork, or a grout of hydraulic cement, and by the time the piles were rotted away the mixture would have become a compact, hard body. A mass of clay as a brace on the water and land sides would make all secure. Even common earth laid at an angle of thirty or forty-five degrees would make an efficient protection.

The danger in all such embankments is the first insidious advances of the water, but I think a muskrat would find it hard to make a hole through this embankment. A. J. WILKINSON.

Pawtucket, R. I.

Hail Storm Phenomenon.

MESSRS. EDITORS:—The village of Portchester, N. Y., was visited by a remarkable hail storm on the afternoon of the 26th. At about three o'clock icy balls, averaging nine inches in circumference, came pouring or dropping down with terrific effect upon the crops—stripping trees, breaking windows and skylights, and developing phrenological bumps of extraordinary altitude upon heads before innocent of such elevations.

The storm lasted half an hour, and was confined within an area of four miles, beyond which limit it was not felt. An enterprising hotel keeper in the village, with a view to profit, and knowing that everything was sent into this world for some good purpose, collected several baskets full of the frozen balls and used them at his bar as a substitute for ice. For a time "hailstone punches," were a favorite beverage, and many who imbibed of them attest the excellent qualities of the drink. McN.

New York, July 30, 1866.

An Unbeliever in Breech-loading Fire-arms.

MESSRS. EDITORS:—A correspondent, in your issue of July 14th, writing under the heading of "Breech-loading Rifles," claims to have some wonderful targets made at 50, 100, and 220 yards. Now, if good shooting can be made by a breech-loader in a favorable time (which I do not believe), then we had better discard all muzzle-loaders, and for the best performances use breech-loaders.

I have used the muzzle-loading rifle for forty years for hunting and prizes, and am firm in the belief that there is no breech-loader that can or ever will be able to compete with a good muzzle-loader, either at target or for hunting, for the reason that the bullet cannot be patched in the breech-loader.

The targets referred to by your correspondent are probably selections from five or six thousand targets. Now, I would like to know if your correspondent can, in a favorable time, make ten shots at fifty yards in a one-inch circle; for we hunters do not reckon it any thing unless we can go out any fair day and do it. I have seen the center nail driven in four times in succession at forty rods, but the man that will buy that gun for the purpose of driving the center at 40 rods, will be mistaken. I hope your correspondent will tell us what he can do with his breech-loader one day with another, then we can judge if it is better than a muzzle-loader. We are all seeking light and information. A. A. H.,

A Rocky Mountain Hunter from 1840 to 1848.

Syracuse, N. Y., July 22, 1866.

Millers Please Notice.

MESSRS. EDITORS:—I have a few questions to ask through your valuable paper—which I take to inform myself on things mechanical.

Can good flour be made with a "stiff spindle burr?" Does it equal or surpass the old style "cock head" in either durability, ease of management or quality of work?

We would like information from some unprejudiced and uninterested party who has tried both, or can speak confidently from practical or scientific reasons. Z. W. WOOD.

Goodland, Ind., July 17, 1866.

NEW INVENTIONS.

The following are some of the most prominent of the patents issued this week, with the names of the patentees:—

TALLOW OIL.—H. R. Colburn, Boston, Mass.—This invention relates to a compound of tallow oil with coal, shale, or heavy paraffine oil, whereby the best properties of each are retained, and the ingredients are so combined that they are not liable to separate, the tallow oil itself giving it substance and durability, and the property of adhering to the machinery when it is used for lubricating purposes.

TRUSS.—CHARLES WESLEY THOMPSON, Batavia, Ill.—This invention consists principally in making the pad in two distinct pieces of wood or other material, placed side by side, so that their action in holding a hernia is like that of two fingers of the hand.

STEERING APPARATUS.—EDWARD ROWSE, Augusta, Me.—This invention relates to certain improvements in that class of steering apparatus in which wheel ropes or tackle are used, in connection with a tiller and hand-wheel windlass, and whereby the wheel ropes are kept taut at all parts of the stroke of the tiller, and the main objection to wheel ropes or tackle thereby obviated.

CHURN DASHER.—GEORGE DECKMAN, Malvern, Ohio.—This invention consists of an improved dasher formed by the combination of a double concave and concavo-convex perforated disk with each other and with the dasher handle.

SORGHUM STRIPPER.—C. L. HART, Mattoon, Ill.—This invention consists in the use of a plate, having holes formed through it, through which the stalks are passed to be stripped—the holes are circular at the inner side or face of the plate, and polygonal at the outer side or face of the said plate; in the combination of the frame and spring bars, and with each other, and with the perforated plate, and in the combination of stripping tubes with the spring bars and with the perforated plate.

MANUFACTURE OF IRON.—JONATHAN M. JONES, East Taunton, Mass., BERNARD SPAULDING, Port Richmond, N. Y., SYLVESTER PARKINS, Providence, R. I.—The object of this invention is to furnish sheet and bar iron, tougher, more flexible, not so liable to rust, and which, when rolled into sheets, will make and take a finer polish than the ordinary iron, and be equal or superior to the best imported iron in all the qualities that make iron valuable.

RECUTTING FILES.—A. A. DUNK, Manchester, N. H.—This invention consists in a new process of recutting and renewing worn files, and such as are badly cut and damaged, so as to make them again serviceable.

TRACE BUCKLE.—R. J. ALGEO, Kalamazoo, Mich.—This invention has for its object to furnish a trace buckle in which the trace can be readily taken up or let out, which does not require to be punched, and thereby weakened, and which will adjust itself to a trace of any thickness, and it consists in making the frame of the trace buckle with slots or elongated holes in its sides, and in the hame tug cap in combination with the said slotted frame of the buckle.

BROOM.—E. P. COOLEY, New York City.—By this invention simplicity, cheapness, and durability are obtained.

WASHING MACHINE.—A. L. DRAKE, Richmond, Me.—This invention relates to a clothes washing machine of that class in which a reciprocating rubber is employed, and it consists in a novel manner of operating the same and graduating the pressure thereof, whereby the clothes will be subjected to a requisite degree of rubbing to thoroughly cleanse them, and without injuring them in the least.

PORTABLE SHAVING CASE.—THOMAS P. CONARD, West Grove, Pa.—This invention consists in combining with a shaving box a water-heating apparatus; and also in so arranging the water-heating apparatus within the shaving case that water can be heated in it without occasioning the least injury to the case.

CLOTHES-WASHING MACHINE.—WILLIAM GOWEN, Warsaw, Wis.—This invention consists in a novel manner of securing the cross bar, which supports the rubber shaft in the tub, whereby it may be readily adjusted in and detached from the tub, so that there will be no difficulty in removing the rubber whenever required. Also in a peculiar way of arranging the cleats on the rubber and on the bottom of the tub, whereby the clothes are operated upon in a very efficient manner.

COVERING FOR STEAM PIPES, ETC.—E. C. LITTLE, St. Louis, Mo.—This invention consists in preventing the radiation of heat from steam pipes and boilers by covering them with a coating of plaster of Paris cement, properly secured with a wrapper when necessary, this substance being cheap and durable, and offering great advantages as a superior non-conductor of heat.

COMBINATION INKSTAND.—GEORGE SCHMIDT, New York City.—This invention is a combination of an inkstand, wafer or sand box, calender, and letter and envelope holders, and pen racks, whereby a very desirable article is obtained for the counting room, and one which may be constructed at a moderate cost and have a neat and ornamental appearance.

SHIRT COLLAR.—S. S. STONE, Troy, N. Y.—This invention is to make turn-over collars, either of paper or cloth, so as to fold down neatly over the band without being rumpled, on being adjusted to the neck, when the necktie is inserted. It also provides against the enameled surface of the collar coming in contact with the necktie or skin of the wearer; a serious objection heretofore existing against such collars. Another desirable feature is that the button hole is made to adjust itself to large or small buttons.

MACHINE FOR SMOOTHING OFF IVORY KEYBOARDS.—MILON

PRATT, Meriden, Conn.—By this machine the keyboards for melodeons, pianofortes, and other musical instruments, are smoothed very nicely and effectively, whereby a great saving of time and labor is effected, beside securing superior workmanship.

HAY FORK AND CUTTER.—J. B. DRAKE, Picture Rocks, Pa.—The tines are formed with cutting edges so that when closed they form a spear point to adapt the instrument to be readily probed into the hay in taking its load.

OIL WELL GAS PIPE ATTACHMENT.—L. W. TURRELL, SAMUEL STANTON, AND L. C. WARD, Newburgh, N. Y.—This invention consists in inserting in the gas pipe, at a point between the well and the furnace of the steam boiler, one or more partitions of wire gauze or wire cloth, so as to prevent, in case of the ignition of the gas, the flame communicating with the gas in the well, it being well known that a flame cannot pass hrough wire gauze or fine wire cloth.

WATER WHEEL.—G. E. CORBIN AND J. W. PUGH, Grand Rapids, Mich.—This invention consists in a peculiar shape and position of the buckets of the wheel, together with a ring and cleats or guides for directing the water properly to the buckets, and in a novel application of the case to the wheel, whereby several advantages are obtained over the ordinary wheels of the same class in use.

WATER WHEEL.—JESSE TUCKER, Adrian, Mich.—This invention relates to a new and improved water wheel of that class which are placed on a vertical shaft and are commonly termed horizontal wheels. The invention consists in a novel arrangement of issues, whereby it is believed that a greater per centage of the direct and reacting power of the water is obtained than with the ordinary horizontal wheels.

FRICTION WINDOW SPRING AND FASTENER.—H. NAYLOR, Pekin, Ill.—This invention consists in the employment of a catch and spring so constructed that when the window sash is closed, the catch will lock and fasten either the lower or upper sash, or when it be desired to raise or lower the sashes, will bear against the stile of the window with sufficient force to prevent the sash descending.

PRIVY SEATS.—J. M. DAVIS, Cincinnati, Ohio.—This invention consists of a cheap, simple and effective construction of a privy seat, the object being to prevent it being soiled.

PADDLE-WHEEL.—CHARLES A. TODD, New York City.—The object of this invention is to obviate the lifting of the water by the floats of the paddle-wheel as they emerge from it, thus relieving them of their back pressure to a great extent.

COMPOUND FOR SETTLING COFFEE.—GEORGE W. CARLTON, Brunswick, Me.—This invention consists of a compound for clarifying coffee, by which it can be accomplished in a most satisfactory manner.

SCREW AUGER HEADS.—RUSSELL JENNINGS, Deep River, Conn.—This invention relates to swaging the heads of augers, and it consists in a novel arrangement of a die and mold, and the manner of operating the die, whereby the desired work may be performed in a very rapid manner and with great perfection.

CAR COUPLING.—W. VAN VALKENBURGH, Smithfield, N. Y.—This invention consists in applying springs to the draw head so that they will resist the movement of the draw head when forced backward under concussions, and when pulled forward, thereby avoiding the sudden jars now occasioned by the stopping and starting of cars. It also consists in a novel latch arrangement for securing the shackle in the draw head, and also in the application of side springs to the draw head to admit of an easy lateral movement of the latter under the side surging of the cars.

PAINT BRUSH.—EMIL HISS, Delaware, Ohio.—The material of which the brush is composed, whether of hair, bristles, or other material, is clamped to the end of the handle by a draw-band which enables the brush to be tightened on the handle as occasion may require, and which also permits the brush-part to be readily renewed.

COMPOSITION FOR ROOFING.—R. B. SMITH, Mount Pleasant, Ohio.—This invention consists of a mixture of tar and a peculiar mineral which is composed of hydro-silicate of iron and alumina, and carbonate of lime and magnesia.

WASHING MACHINE.—WM. AND A. G. KELSEY, Delavan, Wis.—This improvement consists in combining a washing apparatus with a tub in such manner that it may be used alternately for both washing and rinsing clothes; the devices for washing are simple, convenient, and effective, and after using them they are readily turned up on one side of the tub so as to leave it clear for rinsing the clothes, thus making one article serve both purposes.

QUARTZ CRUSHER.—A. LINDSAY, Malone, Franklin county, N. Y.—This invention relates to that kind of quartz crushers, by which the quartz is powdered under so-called chasers, revolving in a groove sunk into a solid bed plate. The improvement chiefly consists in an arrangement by which the powdered quartz is swept from the bed plate, and in a device by which all those parts which are not crushed fine enough, are returned to the crushing apparatus. The machine appears to be very efficient, and can be managed by one person.

MEDICAL COMPOUND.—P. M. DEVOS, New York City.—This invention relates to a medical compound, especially designed for the prevention and cure of cholera and other epidemic diseases, and is to be worn by means of a belt about the body of a person. From the characteristics of the several ingredients composing the compound, its use, at all times, would seem to be conducive to the general health of the person, but more particularly during the prevalence of any of the many epidemic diseases.

LAMP EXTINGUISHER AND REGULATOR.—C. E. LYON, Worcester, Mass.—By this improvement the flame can be regulated at pleasure, or extinguished at any moment, and without danger of an explosion, or allowing a bad odor to escape into the room.

AUTOMATIC BOILER FEEDER.—B. CHALFAUT, Williamsport, Pa.—By this invention the level of the water in the boiler can be preserved with the greatest accuracy, and no further attention is required after the improved feeder has been adjusted.

HOOP SKIRT.—JULIUS SCHLESINGER, New York City.—The hoops of this skirt, instead of being united at their ends, are turned up and fastened to the edges of the opening in the upper part of the skirt, so that it is open all the way down, and the hoops do not interfere with the motions of the feet; the ordinary shape is imparted to it by a secondary skirt extending from the waistband down a suitable distance.

UNIVERSAL TOOL BOX.—JAMES WOLFENDEN, Jersey City, N. J.—This invention relates to a universal tool box, and is intended for sliding off shafting, for cutting V and square threads, and also for steady rest. It is provided with two or more radiating tool holders, which are adjustable according to the size of the article to be turned, and which connect with a scroll in such a manner that the several tools close up simultaneously, and a uniform action of the tools on the work is effected.

BILGE WATER GAGE.—WILLIAM P. KIRKLAND, San Francisco, Cal.—This invention relates to a bilge water gage, composed of a perforated box, containing a float, which acts on an index rod extending through a tube to the deck, so that the depth of water can be ascertained at a glance.

SHOE STRING FASTENER.—E. S. SCRIPTURE, Brooklyn, N. Y.—This invention relates to a little spring catch, which when attached to a shoe or gaiter boot, serves to securely hold the surplus ends of the lacing strings after they have been drawn up snugly.

PISTON PACKING.—A. S. CAMERON, New York City.—This piston packing consists of a wire placed spirally around the circumference of the piston, and is retained in the working face thereof by a spiral groove, so that the wire will be pressed tight against the inner surface of the cylinder by its own elasticity, and a packing is obtained, which is cheap, and not liable to allow the steam to pass it, as it wears.

STEAM VALVE.—A. H. WOODRUFF, Lansing, Iowa.—By this invention large openings for the supply and discharge of the steam are obtained, with a valve of comparatively small area; the pressure of the steam on the back of the valve is partially or wholly balanced; a full supply of steam is obtained at the beginning of a stroke, and the steam may, by adjusting a slide, be worked expansively to any desired degree.

HOOP SKIRT.—CÆSAR NEUMANN, New York City.—This invention consists of a hoop skirt, the wires of which are fastened in the pockets of the tapes by thread of silk, cotton, linen, or other material, in such a manner that the rivets or other metal parts generally used for this purpose can be dispensed with, and all danger of tearing the skirts worn over them is avoided.

REDYEING CUSHIONS OF RAILROAD CAR SEATS.—THOMAS BROWN, Albany, Albany County, N. Y.—This invention relates to a method of redyeing cushions of car seats, by which the color is firmly united with the fiber, and by which also the dye will be held to one side of the cushion, in case both sides want to be differently colored.

APPARATUS FOR COOLING MILK, ETC.—J. OWEN MOORE, Washingtonville, N. Y.—This invention has for its object the cooling of milk to a temperature allowing it to be transported; and the invention consists in so constructing the apparatus that the milk will be cooled while passing through a narrow channel, which is surrounded by water or any other cooling liquid, and in so constructing the apparatus that it can be easily taken apart for cleaning purposes.

Notes and Queries

J. B. B., of N. Y.—A mixture of two parts brick dust to one of plaster of Paris will make a mold for type metal. It is mixed with water to the consistency of egg yolks. A mold can also be made of plaster alone. The only breech-loading rifle with which we are acquainted, designed for open powder and ball, is the Colt's repeating rifle.

A. F. P., N. Y., desires to know if the fact, that a large wheel passes over a greater distance in a given time than a smaller one, could not be applied to the rounding of curves by rail cars. We answer, yes, if all the curves were of the same radius and trended the same way, but if the wheels were rigidly secured to their axles, as usual, how would they run on a straight track? The principle of adapting the diameter of the wheel to a curve is applied to the carriages for heavy guns in fortifications.

A. C. K., of N. Y.—Geo. C. Round, Wesleyan University, Middletown, Conn., can probably give you the information you desire as to the method of reading the Signal Corps' cipher.

J. S., of N. Y.—The "Miller, Millwright and Engineer's Guide," published by Henry Carey Baird, 406 Walnut street, Philadelphia, gives instructions about hanging the sash saw, and Holly's "Art of Saw Filing," or Parsons's "Sawyer's Companion" explains the methods of filing and setting the saw.

D. C. M., of Pa.—We do not think fire armor is now used. The description in this paper, to which you refer, was intended mainly to furnish good air to firemen, when in burning buildings. Your plan of making coffee is not new.

J. G. B., of Ky.—We cannot tell you the exact process of welding cast iron and steel. We think, however, it is done by means of a flux and compression or percussion.

G. W. H., of Pa.—Woolen goods are bleached by the same process as straw goods, viz: fumigation by the fumes of burning sulphur, or soaking in a solution of sulphurous acid. The goods must first be thoroughly cleaned from grease, etc. A soap which will promptly remove the stains of crude petroleum oil from woolen and other goods is now a great desideratum. Some remedy for the evils attendant on the use of petroleum lubricating oil, in cloth factories, is in demand; here is a chance for the inventor. Watson's treatise on weaving, published by Baird, Philadelphia, is the book you want.

B. C., of L. I.—Newspaper controversies as to priority of invention are interesting to but few, and the public generally sympathize with the one who puts his ideas into some tangible form. In this case Dr. Andrews antedates your claim, as we heard him state that he discovered and applied the principle 16 years ago.

A. L. H, of Ohio.—You will fail in attempting to drive a mill and propel said mill through the water by wind power.

J. T., of Del.—To set a slide valve, put the valve in the chest, connect the gear and turn the crank to see if the eccentric rod is of the right length. If it opens one part more than the other, shorten or lengthen the rod one-half the amount required to make both parts open alike. When the valve runs square put it at the lead you require, turn the engine on its center and move the eccentric on the shaft, until the rods will connect. It will be then nearly in the right place, but will require some adjustment. You should give twice the lead you require if the valve is set cold, for the springing of the rods, lost motion and expansion will shorten the lead materially.

NEW PUBLICATIONS.

"HAYES'S RAILROAD FAST EXPRESS WAGES COMPUTING TABLES," is the imposing title of a very useful compendium of calculations, the value of which is not enhanced by the title. The volume is an elaborate and comprehensive arrangement intended for railroad men, and admirably adapted to the requirements of the managers of large concerns who have to calculate the pay per hour, day, week, and month for men employed at varying rates of wages. The tables contained in the volume are calculated by tenths, and range from the rate of sixty cents per day to five dollars. With the plan adopted by the compiler, no fraction between these two points can escape observation, and all the calculations which so often occupy valuable time and snarl overtaxed brains, are avoided.

From a careful examination of the volume, and several experimental analyses of the compiler's plan, we judge that the publication is of great value to all who are compelled to make calculations from data so varying as the difference in amounts and time, and the wages of employés in large concerns.

It is handsomely got up, the paper printed on only one side, and the calculations mathematically correct. Published by Rockwell, Baker & Hill, Buffalo, or by Lester Hayes, the compiler, Kent, Portage county, Ohio.

THE MARKETS.

GOLD has ruled quiet and steady. There is but a moderate demand for export, and only a fair amount is being taken for Custom dues. The bulk of the transactions have been at about 130 ₱ cent. Call loans on stock securities are readily obtained at from 4@5 per cent; on bond and mortgage 6@7. First-class bills, sixty days, endorsed, 6 ₱ cent, and for three or four months, ½ ₱ cent additional. Government securities are held firmer, and prices rule a shade higher. Stocks in fair demand and without decided change. There is a quiet market in most standard articles. Holders are firm and buyers not over anxious. Building materials have slightly advanced. Coffee has experienced a rise, particularly in West India varieties. The grain and flour market is steady without much foreign demand. Corn is somewhat lower. Iron, pig, is dull, and the demand for bar and scrap light. Lead in fair demand and prices somewhat lower. The market for leather is looking up. The largest advance is noticeable in builders' materials, for which there is a good demand. Nails, especially some varieties of cut, have advanced ¼ cent ₱ lb.

ASHES—Pots are quite dull, but with continued light receipts, market steady; the sales are 50@60 bbls. at $6 37½. Pearls are nominal; we hear of no business.

BRICKS—Common Hard have advanced to $12. Croton and Philadelphia are unchanged at $14@$15 for the former, and $40 for the latter.

COFFEE—Laguayra, 12½@12¾ gold, in bond. No shipments from Rio for the States.

COPPER—Detroit, 31@31½; Portage Lake, 31.

COTTON—Market steady. Ordinary, 27@28; middling, 30@37.

FLOUR—Common brands, $8 10@$9 50; Genesee extra, $10 10@$13 00; Canada, $8 80@$12 00.

MEAL—Dull; Rye-flour and corn lower.

GRAIN—Corn, 84; medium Western; 87½; Oats, 60@65.

IRON—Market inactive. No. 1 American pig $47@$48. Scotch, $47@$50. Bar and scrap very quiet.

LATHS—Are firm, with sales of Eastern, at $3 12@3 88, three months.

LEAD—Pig has been offered at lower prices, and buyers have purchased more freely; the sales are 400 tons best (Graville), to arrive, at 7¼ cents; 50 do. common Spanish, 7, gold; 2,000 tons Spanish and German, on terms not made public; best English is held at 7¾. The bulk of the stock of Foreign, however, is not offered, holders awaiting the turn of events in Europe. Bar, Pipe, and Sheet are steady and active at 11¼ cents, cash.

LEATHER—The market for Hemlock Sole continues active, and prices are very firm. We quote Rio Grande and Buenos Ayres Light Weights, 33@34 cents; Middle do., 32@33; Heavy do., 30@31; California Light, 31@32; Middle do., 33@34½; Heavy do., 34@35; Orinoco, &c., Light, 31@32; Middle do., 32@34; Heavy do., 29@32; Slaughter Upper in Rough, 31@33. Oak Sole is in light stock, and the market is firm. French and American Calf Skins are firm with a fair demand.

LIME—Rockland is in good demand, with sales of 5,000 bbls. Common at $1 50; Lump is nominal at $2 10, cash.

LUMBER—There is an active demand for Eastern Spruce, with sales of 1,425,000 feet at $23 50@$25, usual terms; 140,000 feet Georgia Pitch Pine Lumber, at $28 for Flooring Boards and Step Plank, as they ran; $40 for Scantling, and $45 for 5 by 12 Timber, 2 mos.

NAILS—Cut are very firm and scarce, with a tendency to advance; some sizes are scarce, and for these ¼ cent more is paid. We quote: Cut, 6¾@7 cents; Clinch, 8¼; Forged Horse, 22@24; Pressed do., 22@24; Copper, 50; Yellow Metal, 28; Zinc, 20; and Wrought Ship and Boat Spikes, 7@8 cents, as to sizes, net cash.

SUGAR—Prices have favored sellers, and we have to notice an advance of ¼ of a cent ₱ lb on Refining grades, bringing Fair Refining Cuba to 10¾@10¾ cents; Good, do., to 11@11¼; and No. 12 Box to 11¾@11¾, 4 mos. Grocery grades are without particular change, but are the turn dearer. Refined continues in good demand, but is less active than before. Messrs. Stuart quote their best Crushed, Granulated, and Ground, 16¼ cents; White A, 16¼; and Yellow C, 15¾—the range of other manufacture is 16¼@17 cents for Hard; 15¾@16¼ for Soft White (B and A only), and 16@15¾ for Yellow.

WIRE—Telegraph, 9c.@10c. for Nos. 7 and 11, and for hoop skirt, 55c. for No. 18 covered, and 35c. for uncovered.

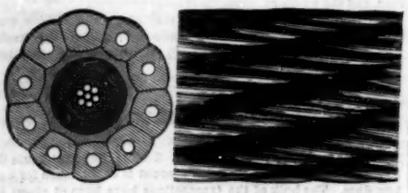
WOOL—Market unsettled, and prices 10@30 ₱ cent lower.

ZINC—9¼c. less 4 per cent. for gold. Market dull.

THE ATLANTIC TELEGRAPH.

The successful laying of the submarine telegraph between Ireland and Newfoundland marks an era in ocean telegraphing. Much credit is due the gentlemen who have persisted, under the depressing influences of successive defeats, in determining the practicability of uniting the two continents by a telegraphic cable. There can be no reasonable doubt that the feat of transmitting legible signals, conveying messages between Heart's Content, Newfoundland, and Valentia Bay, Ireland, has been performed, however much the declared success of the cable of 1858 was questioned. We sincerely hope that this success may be permanent.

The cable having been laid, the only fears for the permanence of its continuity must arise from the disturbing elements on the bed of the ocean, which, with the best scientific and mechanical appliances, are comparatively undetermined. The data in regard to ocean currents over the line of the telegraph, and in regard to the form and condition of the bed on which the cable is supposed to rest, are not sufficient to base a logical argument upon as to the permanence and reliability of the cable's continuity. These data also are contradictory; the most favorable representing an elevated plateau, und isturbed by the undulations of the surface, and beyond the reach of currents and the abrasions of icebergs. Sudden depressions and perpendicular precipices were not believed to exist, which might expose a portion of the cable to continual chafing until the connection was



severed. But other examinations occasion a doubt whether these conditions exist in so favorable a form. The cable crosses a portion of the Grand Banks, on which it is believed very large icebergs sometimes ground. Soundings, however carefully conducted, could hardly be depended upon to discover the existence of high rocks, or other elevations, descending precipitously to great depths. It is hardly possible to ascertain the point where the elevated plateau would sheer off to a deep chasm or valley. The lead-line might strike the brow of a bluff and glide off into water of great depth when all appearances would indicate a uniform plane. It is evident that, even if there were no deep sea currents in the path of the cable, whose influence reached to the bottom, there might be places where the cable would hang suspended from a point, which is as yet undiscovered, but which would project near enough to the surface to be affected by a current.

The fact, therefore, that telegraphic connection has been completed between the two continents, affords us but little encouragement for the perpetuity of such connection. The bed of the ocean is an unknown region which no means, as yet discovered, can enable us to thoroughly survey.

To give our readers an adequate idea of the present telegraph we reproduce from the *Engineer* the external view of the cable, with an end section, both full size. The cable of 1858 is well known to our readers by the numerous specimens to be found all over the country. The difference between the two is in a heavier conductor, consisting in each case of seven copper wires—six laid round one; in the insulation, which, in the present cable, is composed not wholly of gutta-percha, as was the former, but of that substance alternated with Chatterton's compound, an English patent, and in covering the sheathing of iron wires simply with Manilla yarn instead of india-rubber and tar. These variations do not constitute any very radical difference between the cable of 1858 and that of 1866.

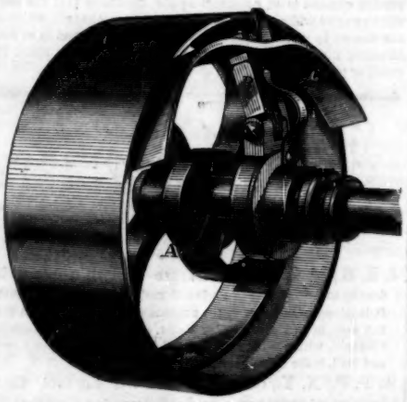
One of the most remarkable circumstances attending the laying of the present cable is the directness of the route taken by the *Great Eastern* and the small percentage of slack of the cable paid out compared with the distance run. The whole distance run was 1,669 miles and the whole length of cable laid 1,864. Much of this difference was made at the shore ends. The log of the steamer shows:—

SATURDAY, 14TH.—Distance run, 108 miles; cable paid out, 116 miles.
SUNDAY, 15TH.—Distance run, 128 miles; cable paid out, 139 miles.
MONDAY, 16TH.—Distance run, 115 miles; cable paid out, 137 miles.
TUESDAY, 17TH.—Distance run, 118 miles; cable paid out, 139 miles.
WEDNESDAY, 18TH.—Distance run, 105 miles; cable paid out, 125 miles.
THURSDAY, 19TH.—Distance run, 122 miles; cable paid out, 129 miles.
FRIDAY, 20TH.—Distance run, 117 miles; cable paid out, 127 miles.
SATURDAY, 21ST.—Distance run, 122 miles; cable paid out, 136 miles.
SUNDAY, 22D.—Distance run, 123 miles; cable paid out, 133 miles.
MONDAY, 23D.—Distance run, 121 miles; cable paid out, 138 miles.
TUESDAY, 24TH.—Distance run, 121 miles; cable paid out, 135 miles.
WEDNESDAY, 25TH.—Distance run, 112 miles; cable paid out, 130 miles.
THURSDAY, 26TH.—Distance run, 128 miles; cable paid out, 134 miles.
FRIDAY, 27TH.—Distance run, 112 miles; cable paid out, 118 miles; which, with shore end off Valentia, distance 27 miles, cable paid out 30 miles, makes distance run 1,669 miles, and paid out, 1,864 miles.

The raising of the last cable, and its connection with this continent, which it is hoped and expected can be successfully accomplished, with the relaying of the connection between Newfoundland and the main land, will give two entire lines between America and Europe. In that case we believe it would be good policy for the directors to reduce the charge for conveying messages from the present exorbitant rates.

BIRDSALL'S PULLEY.

The advantages of friction pulleys for driving machinery are so well known and have been alluded



to so frequently in these columns, that we shall not repeat them. It is not amiss, however, to state once more that one pulley and one belt are dispensed with by such an arrangement, as also the expense of repairing the same.

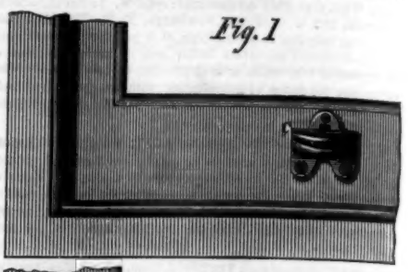
The pulley here shown is adapted for driving heavy machinery, and is a combination of the clutch and friction principles usually employed singly. It is, in detail, a pulley turned up true inside and out, having a socket, A, in the hub to receive a dog on the sliding collar. The end of the shipping bar works in a recess in the collar, as usual, and by throwing the same in gear, the dog falls into the socket, and the toggle joint, B, throws the spring plate, C, into contact with the rim of the pulley, the friction of course aiding in driving the main shaft. This is the whole arrangement, and it is claimed to be particularly adapted to heavy machines for the certainty of its action.

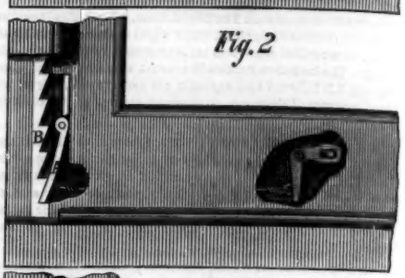
A patent on this pulley is now pending through the Scientific American Patent Agency, by E. M. Birdsall, Penn Yan, N. Y., whom address for further information.

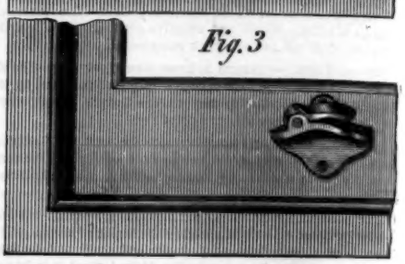
THE Oakland Works, at Sag Harbor, N. Y., are finishing a fine clock for the Court House at Salt Lake City.

TOSHACH'S SASH SUPPORT.

The petty trials of life are often harder to bear than positive afflictions, and of all nuisances we place an obstinate window sash at the top of the list. It is not necessary, perhaps, to harrow up any one's feelings by a recital of all the casualties and annoy-







ances springing from this cause; we therefore proceed to give an infallible remedy for the ills a window sash is heir to. That remedy is illustrated herewith.

Figures 1, 2, and 3 show, respectively, one corner of a window sash and framing, with the apparatus for opening it—a section of the framing revealing the arrangement, and a different arrangement of the parts externally to accomplish the same end.

It will be seen that the sash is without cords or weights, and that it is held at any desired point by a spring dog, A, working in a rack, B. The dog is connected by a wire and a lever to the thumb piece or handle, C, by which the window is raised, so that in raising the window and removing the hand the sash stops itself at the point it was raised to; it is lowered by simple pressure on the projection, D.

This mechanism is certain in action and not costly. The parts are few and simple, and will last for years with proper care. All sudden dropping, so fatal to windows with large and costly panes, is obviated, and the operation is so simple as to be easily understood by children and servants.

It was patented on June 27, 1865, and Jan. 9, 1866. For further information address Wm. Toshach, Sec'y National Manufacturing Co., No. 52 William street, New York.

Patent Swindling.

A correspondent in Altoona, Pa., complains that he, among others, has been swindled by a man representing himself as an agent for a patent corn sheller. The game appears to be selling the right to use the machine and a case of castings for making them, receiving the money, giving a receipt, but never sending the castings.

We cannot tell whether the patent alluded to has ever been issued. If so, it was probably by some other name than that by which it was sold. The game is an old one and has before been exposed in our columns. The only safety is to refuse to pay for what one does not receive, and never trusting to the mere word of an irresponsible agent. In such cases the written promise and receipt of an unknown and uncertified man is no protection nor assurance against a swindle.

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SUCCESS THE POPULAR ESTIMATE OF VALUE.

Nothing is easier of demonstration than that the value of an improvement will not be recognized by the world at large, and particularly by governments, until its necessity has been proved by the failure of old-fashioned substitutes. In our late war the Government used breech-loaders, but it was only because it could not obtain muzzle-loaders in sufficient numbers. After contracting with the British for the Enfield rifle, and purchasing large quantities of the worthless Austrian muskets, it permitted, rather than encouraged, the use of our own superior breech-loading rifles. To be sure some regiments and companies were supplied, early in the war, with the Sharps rifle, but it was because the old-fashioned muzzle-loader could not be obtained, either in this country or in Europe, in sufficient numbers to arm the hundreds of thousands of soldiers which the necessities of the nation called into service. Yet at the first Bull Run battle Burnside's Division was relieved by the Second Connecticut Regiment, eight companies of which were armed with the Sharps rifle, with which the most ordinary soldier could deliver from ten to fourteen shots per minute, and the practiced man extend the number to twenty.

From the remarks of the press in regard to the Prussian needle gun, which it is claimed won the Prussian victories, the uninformed reader is led to infer that this weapon is the most effective known for infantry and cavalry. This is not so. The needle gun is a breech-loader, and in this fact alone is its wonderful superiority over the Austrian or other muzzle-loading muskets. We have had for many years much superior weapons—many of them—and they were thoroughly tested in our war, but never were the conditions so favorable for making a contrast as in the present European contest. There the whole Prussian army, of drilled men, horse and foot, were provided with a breech-loader, the use of which had been taught to them. On the other hand, the Austrians adhered to the old-fashioned muzzle-loading piece. There were two armies equipped with weapons entirely differing in operation, and the contrast, if any existed, must perforce be very marked. In our case the combatants on each side were armed very much the same, with few and isolated exceptions. Where one regiment was provided with breech-loaders, there were many others using only the common muzzle-loader. The superiority of the one over the other was shown mainly in those encounters in which a single regiment, armed with breech-loaders, was opposed to an equal or superior force, using the muzzle-loader. These exceptional cases were not important enough in their general results to attract marked attention. The assumed peculiarity of the Prussian arm is in the ignition of the charge at the base of the ball instead of at the breech. This, it is claimed, increases the velocity, and consequently, range and penetration, of the missile. But this is not a new device, nor is it peculiar to the needle gun. Breech-loaders have been constructed in this country which fired the charge at the front of the cartridge. It does not appear that in the battles fought in Europe the circumstances were favorable to the test of range, and all that can be claimed for the Prussian gun, over muzzle-loaders, is greater rapidity in delivering shots.

This was amply substantiated and demonstrated in our own contest, but because the circumstances of the trial were on a smaller scale than those in Germany, the world at large gave them very little attention. The lesson which the nations of Europe are beginning to learn from the Prussians was given in our own struggle, but unregarded because unaccompanied with the imposing circumstances which attended the late European battles.

AN ABSURD TOOL.

The latest English novelty in the way of machine tools, is a hydraulic press slotting machine. That is to say, there is a belt, pumps, and valves to drive a hydraulic cylinder, which, in turn, operates the tool, the cylinder being placed directly over the beam which carries the cutter.

In our experience with machines of this class we never remarked a lack of force or a want of simple mechanical agents to obtain it, but we have found much difficulty in getting tools to stand heavy cuts. Precisely how a complicated water cylinder, with valves, three-throw pumps, and their pistons, is to remedy this, we cannot see. There is no other trouble with a slotting machine which is not easily remedied. Not the slightest chattering is perceptible in well-made machines, and work is done every day up town, in the Novelty Works, Morgan Works, and others, which can be polished without the use of a file. It is merely a question of fine feed and a sharp, properly-made tool. With these adjuncts, and soapy water, neat and beautiful work can be executed.

To complete the efficacy of this belted three-throw pump and water-cylinder slotting machine, we are informed that it has no self-acting feed "as large slotting machines are best worked without such a device—the constant attendance of the workman being necessary." This assertion will surprise many. Those who have seen a key-way cut (fed by hand) in a heavy connecting rod, and the same work done by a regular feed, will know how much importance to attach to it. It is not possible for man to feed by hand, in any thing like the same time, as regularly as an automatic arrangement for the purpose. Nor is it by such machines that we shall advance in the art of iron working. The object is to simplify, not to add to the complexity of our tools, and no advantages exist in a three-throw pump water-cylinder slotting machine that are not obtained at far less cost of construction, to say nothing of repair, in a rack and pinion, or a crank machine.

IMPORTANT DECISION—EXTENSION OF TANNER'S CAR-BRAKE PATENT.

We have before us the decision of the Commissioner of Patents in the above case, which settles, so far as the Patent Office has jurisdiction, a question that affects the rights of inventors and assignees in patents sought to be extended.

It appears that A. G. Batchelder and L. F. Thompson applied for a patent for an improved car brake, on the 26th of June, 1847, and after an unusual delay, the patent was issued June 6, 1852, to Henry Tanner, assignee of said inventor.

In due time application was made for the extension of said patent, by Batchelder, and the administrator of Thompson. Opposition was made to this extension by interested parties, on the ground that it was not issued to the inventors, but to an assignee, consequently the Commissioner had not power under the 18th Section of the act of 1836, to extend the patent. The Commissioner, however, cites the fact that on two previous occasions decisions had been rendered, that a patent thus issued might be extended for the benefit of the inventor, and that this had been misunderstood in the Office to be the correct rule to govern its action in such cases. It is settled by judicial decisions that the term "patentee," as employed in the statute, is equivalent to the term "inventor," so far at least as to exclude any person who is merely an assignee.

The Commissioner took the broad and correct ground that the inventor only could apply for the extension; and, furthermore, that the extension would inure solely to the benefit of the inventor.

In the case of Wilson *vs.* Rosseau, Judge Nelson, for the Court, decided that the extension of a patent does not inure to the benefit of assignees or grantees under the original patent, so as to vest in them any exclusive right. But the benefits of such renewal, extended to assignees or grantees, is limited to those who were purchasers of the patented article previous to the time of the renewal, and saves to such persons the right to use the machines so purchased by them at the time of such renewal, to the extent of their interests, be that interest in one or more machines.

We understand that this decision of Justice Nelson does not, however, apply to the parties who are now using car brakes that embrace the principles covered by Tanner's patent, as they were simply licensed to use the invention for a certain term, which did not include the extended term.

THE CHARGES OF THE ATLANTIC TELEGRAPH COMPANY.

The published scale of prices of the Atlantic Telegraph Company shows that for a message of twenty words, *including* date and address of sender, the sum of £20 will be charged—which is equal to $150 American money at the present rate of gold; further, that all figures must be written out, when they will be charged as words. Messages in cipher will be double the above rates.

Vast amounts of money have been invested and sunk in laying the cable, and its permanency is at least uncertain, but it does not seem to us judicious to attempt to get *all* the money back this summer. There are not many journals or firms that can afford to have regular messages of any length, and, under the circumstances, the news transmitted would be scanty and indefinite. Heavy rates defeat the end and aim of such enterprises, which are to be a popular medium for the transaction of business. Short names will be popular, and the English language will be sorely tortured to express a great deal in a few words. The definition of "cipher messages" will have to be laid down unmistakably, and we imagine it will be difficult to draw the line.

The cable, however, is not indispensable; steamers cross in nine days; from land to land in much less time; and, except in cases of great urgency, the capacity of the line will not be taxed to its utmost, unless the tariff of charges be considerably reduced.

Doubtless the competition of the Collins Overland Telegraph will have a healthy effect, and aid materially in lowering the price.

Atlantic Telegraph—Exorbitant Charges.

We had occasion to send a telegraphic message to our correspondent in London, through the Atlantic Cable, consisting of exactly twenty words, which, according to the published schedule, should have gone forward for £20 sterling, but the director at this end charged £24, or $120 in gold, so as to cover the date of transmission.

We wish the Submarine Telegraph Company success, but it seems to us impossible that the public can submit to such exorbitant, and as it appears to us, unreasonable charges.

If this company insist upon putting in a date which was of no importance to us, we submit that we ought not to be compelled to pay $5 in gold for every word thus interpolated by the Company.

GENERAL GRANT has been promoted to the position of "General of the Armies of the United States," a grade recently created by act of Congress. There has been some bother among military men as to what device should be adopted to designate his high rank. We suggest a gold plate, with A (1) engraved upon it.

ISSUED FROM THE U. S. PATENT OFFICE

FOR THE WEEK ENDING JULY 31, 1866.

Reported Officially for the Scientific American.

☞ Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required, and much other information useful to inventors may be had gratis by addressing MUNN & Co., Publishers of the SCIENTIFIC AMERICAN, New York.

56,687.—APPARATUS FOR WORKING HIDES.—A. Adler, Paris, France.

I claim the machine for working and preparing skins, constructed and arranged for operation substantially as herein set forth and described.

56,688.—WASHING MACHINE.—Ambrose Alexander, Middleville, Mich.

I claim as new the employment of dash board, I, with supporting friction rollers, J, in combination with a compound leverage, A D E F and G, for operating the same as substantially described.

56,689.—TRACE BUCKLE.—R. J. Algeo, Kalamazoo, Mich.

I claim the slotted sides of the frame, C, in combination with the bolt, B, and tug cap, D, constructed as described and operating in the manner and for the purpose specified.

56,690.—SMOKE AND DRYING HOUSE.—H. A. Amelung, New York City.

I claim, First, The application of one or more soot catches, i, in combination with the grate, h, and diaphragm, g, in the interior of the furnace, F, in the manner and for the purpose substantially as herein set forth.

Second, The movable beams, E, in combination with the hoisting tackle e f, or its equivalent, and with the drying or smoking house, A, constructed and operating substantially as and for the purpose herein shown and described.

56,691.—FEATHER-COVERED PARASOL.—Gustav Anton, Philadelphia, Pa.

I claim as a new article of manufacture, a parasol having a top or covering composed of feathers, secured to a central piece of wood or other suitable material, substantially in the manner set forth.

I also claim in combination with the improved covering the described tilting motion of the same upon the stem when the latter is made adjustable in length, substantially as and for the purpose described.

56,692.—MEAL AND FLOUR SIFTER.—Francis Arnold, Haddam Neck, Conn.

I claim the metallic plates, E E', connecting the paddles (C and D), in combination with the adjustable sleeve, B, and handle, F, when arranged and used as and for the purposes set forth.

56,693.—GATE.—Vantuyl Babcock, Marshall, Mich.

I claim the arrangement and combination of the rail, G, saddle pieces, I, rollers, R1 R2 R3, and supplemental posts, E and J, with an ordinary gate and fence, substantially in manner and for the use herein specified.

56,694.—STEAM GAGE.—Richard C. Blake, Cincinnati, Ohio.

I claim spiral corrugations in diaphragm spring of a steam gage, substantially in the manner and for the purposes set forth.

56,695.—PORTABLE FENCE.—John Breneman, Mount Joy, Pa.

I claim the combination and construction of the two panels of a fence so that the upper and lower rails, R1 R2, of the one will pass between those of the other, the ends of the rails of every alternate panel provided with a short piece, S R, forming an open space for a key board, k, passing through the over-lapping ends and firmly uniting them, in the manner and for the purpose shown and specified.

56,696.—HARVESTER RAKE.—J. O. Brown, A. Ingham, and F. T. Lomont, Massillon, Ohio.

We claim, First, The rake, R, pin, r, weight, t, and slide, k, in combination with the tipping platform, A, guide, o, and notches, u u', arranged as and for the purpose substantially as set forth.

Second, The roller, H, apron, H', and cords, e' I', or their equivalents, in combination with the pulleys, F J, and lever, J', substantially as and for the purpose described.

Third, The shaft, c, arms, E F, and slide, k, in combination with the arm, f, lever, J', and platform, arranged and operating substantially as and for the purpose specified.

Fourth, The platform, A, roller, H, and apron, H', in combination with the cords, e' I', lever, J', and arm, f, substantially as and for the purpose described.

Fifth, Hanging or pivoting the platform, A, to the rear end of the shoes by means of the arms, E and F, when said platform is provided with the rake, R, grooves, i, and slats, j, substantially as and for the purpose specified.

Sixth, Attaching the arm, P, to the swarth board, D', in combination with the cords, I, or equivalent lever, J', and platform, as and for the purpose set forth.

56,697.—RE-DYEING THE CUSHIONS OF CAR SEATS.—Thomas Brown, Albany, N. Y.

I claim, First, Exposing the cushions after the color has been applied to them, to the action of steam, substantially as and for the purpose set forth.

Second, The boiler with a perforated shelf, a, and close-fitting cover, b, in combination with a furnace, B, and with the cushions to be steamed, substantially as and for the purpose described.

Third, The frame, C, with adjustable sides, c d, constructed and operating substantially as and for the purpose set forth.

56,698.—HARVESTER.—Robert Bryson, Schenectady, N. Y.

I claim, First, Pivoting the forked ends of the harvester pitman rod, B, to an adjustable strap, p, of a two-part pitman box, e, substantially as and for the purpose described.

Second, Constructing the frame, D, substantially as described, in combination with supporting this frame upon the axle, B, of two drive wheels outside of a hinged frame, C, substantially as set forth.

Third, The application of guards, G, to the inside gear, A', of the driving wheels, substantially as described.

Fourth, The arrangement of the lever, J, so that it forms an intermediate connection between the hand lever, E, and the finger beam, and its inner long arm, slides upon the lower surface of the platform plate, g; the said lever, J, and the hand lever, E, being applied to a harvester having two hinged frames, C D, and a hinged cutting apparatus, all substantially as described.

Fifth, The arrangement of the double tree, k, staple, h', pin, h', hook, l, chain, m, and hook, j, in the manner and for the purpose herein described.

56,699.—PISTON PACKING.—A. S. Cameron, New York City.

I claim the spiral packing wire, b, in combination with the piston, A, substantially as and for the purpose described.

56,700.—BED-RECOIL SPRINGS FOR PRINTING PRESSES.—Andrew Campbell, Brooklyn, N. Y.

First, I claim so applying the bed-recoil springs of a printing press that they are always in contact or connection with the bed of the press through levers operating the springs, substantially as described.

Second, I also claim so applying the bed-recoil springs of a printing press that the bed when running faster in one direction than the other, may have the required degree of recoil given to it in either direction by one set of springs, substantially as described.

56,701.—PRINTING PRESS.—Andrew Campbell, Brooklyn, N. Y.

I claim the mode of converting the rotary to a reciprocating or rectilinear motion, as above described, or its mechanical equivalent, for the purposes set forth.

I also claim the V-shaped bearing, T, as applied to the front guide of printing presses, substantially as described and for the purposes set forth.

56,702.—DRY DOCK INDICATOR.—Peter F. Campbell, Jersey City, N. J.

I claim the combination with the section or compartment of a dry dock, of the floats, and an indicating apparatus, substantially as and for the purposes set forth.

56,703.—BRICK MACHINE.—E. P. H. Capron, Springfield, Ohio.

First, I claim the combination of the pressure roller, P, with flap, O.

Second, The combination of the hinged flap, O, with its sliding rods.

Third, With the follower, N, the combination of the rod, j, when the latter is provided with an articulated lever, K, at its upper end, to raise the lid, the whole being constructed and arranged as described.

56,704.—COMPOSITION FOR SETTLING COFFEE.—George W. Carleton, Brunswick, Me.

I claim a composition for clarifying coffee, made substantially as herein specified.

56,705.—BORING AND GRINDING APPARATUS.—Samuel Cary, Centerville, La.

I claim, First, The application and use of tempered steel notched or toothed plates, secured so as to be adjustable to the arms of a metal flanch to form a boring and grinding mill, for the purposes herein set forth.

Second, The drilling, boring, and grinding apparatus in combination with the screw-feed mechanism and driving machinery, as and for the purpose specified.

56,706.—BOILER FEEDER.—Brantly Chalfant, Williamsport, Pa.

I claim, First, The many-chambered barrel, A, placed in an oblique position between suitable bearings and provided with pipes, E F G H, substantially as and for the purposes set forth.

Second, Also the self-tightening key, E', in combination with the standard, D, cap, B, and barrel, A, constructed substantially as and for the purposes described.

56,707.—STOVEPIPE TOP.—William Chappell, Buffalo, N. Y.

I claim the T-pipes, C C, provided with holes, f f, or their equivalent, in combination with the spring, e, and adjustable pipe, a, provided with elbows, c c, the whole arranged and operating substantially in the manner set forth.

56,708.—GRAIN DRIER.—George Clark, Buffalo, N. Y.

First, I claim the construction and arrangement of grain-drying perforated cylinders and two or more hot-air chambers in such relation to each other that the hot-air chambers shall be heated centrally within the cylinder (the body of grain to be dried being outside of the chambers), and the hot air supplied centrally to each chamber by means of hot-air conducting pipes so as to issue from all parts of the chambers and pass directly through and at right angles (or nearly so) to the direction of the body of grain passing between the cylinders, substantially as described.

Second, Placing and using screws, or equivalents, in the grain space between the cylinders so that the grain must pass through these screws and thereby be turned over or changed in the position of its kernels in reference to the inner and outer cylinders, and thereby insure all parts of the grain to be acted upon equally by the hot air, substantially as described.

Third, Dividing the inner perforated cylinder into two, three, or more hot-air chambers, each chamber being separate and independent of the other, and each having distinct hot-air flues, so that the hot air in each chamber may be regulated and controlled independently of the other, for the purposes and substantially as set forth.

Fourth, Placing and arranging the said perforated cylinders and hot-air chambers within an outer stack, so that an evaporation space shall be formed between the larger cylinder and the outer stack, and evaporation from each chamber be discharged, substantially as set forth.

Fifth, The construction, application, and use of an inner furnace door or valve, Z, opening inwardly, for the purpose and substantially as described.

Sixth, A weighted, conical valve, P, placed at the top of the drying cylinder to insure an equal distribution of the grain into all parts of the grain-drying space, substantially as described.

Seventh, In a grain drier constructed substantially as herein described, I claim the arrangement therewith of the valves, T, and movable disk, T', for the purposes set forth.

56,709.—DRAUGHT COCK FOR SODA WATER APPARATUS.—Wm. P. Clark, Boston, Mass.

I claim a soda cock constructed with an induction pipe, H, and two sets of eduction pipes, J and L, and two valves, F and G, actuated successively by a common stem, E, and resting upon different valve seats, said several parts being respectively constructed and the whole combined and arranged for operation, substantially as set forth.

56,710.—MEASURING FUNNEL.—John W. Clark, Kingston, Wis.

I claim a funnel provided with the screw, E, arranged to operate substantially as and for the purpose set forth.

56,711.—SULPHUR DUSTER.—John W. Clark, Kingston, Wis.

First, I claim the fan, B, mounted in a suitable case and arranged to operate in combination with the spout, F, hopper, E, and feed wheel, a, or their equivalents, substantially as shown and described.

Second, In combination with the nozzle, H, with its perforated cover and the valve, n, arranged and operating as set forth.

Third, The auxiliary tube, m, arranged to operate in connection with the spout, F, as set forth.

56,712.—PACKING PROJECTILES FOR RIFLED ORDNANCE.—John Webster Cochran, New York City.

First, I claim the band, b, saturated fibrous material, f, and coiled wire, d', in combination with each other and with the circumferential and longitudinal grooves in the projectile, substantially as and for the purpose herein specified.

Second, The grooves, c c, arranged with reference to the grooves, a a and m, for the reception of depressions of the expanding band, as and for the purpose herein set forth.

56,713.—PADDLE WHEEL.—Elisha P. Colburn, Boston, Mass.

I therefore claim the improved arrangement of the guide wheel, c, and the bearing wheels, d d, the latter under such arrangement having the wheel, c, between them, as set forth.

56,714.—CLOTH GUIDE AND BINDER GAGE FOR SEWING MACHINES.—L. T. Conant, New Lisbon, Ohio. Antedated July 25, 1866.

First, I claim the base plate, A, with its gaging lips, c c, slot, D, binder slot, F, upright post, F, and screw, G, in combination with the arms, M M, binders, J, and spring, N, as and for the purposes specified.

Second, I claim the adjustable inclined arms, M M, in their combination with the base plate, A, upright post, F, regulating spring, N, and binders, J, as and for the purposes specified.

Third, I claim the seamless clamping binders, J, or an equivalent, with its regulating nut, I, and separating block, K, in combination with the base plate, A, and inclined arms, M M, as and for the purposes specified.

Fourth, I claim the regulating spring, N, or its equivalent, in combination with the inclined arm, M M, and binder, J, all operating as and for the purposes specified.

56,715.—PORTABLE SHAVING CASE.—Thomas P. Couard, West Grove, Pa.

I claim a case or box, constructed to receive the various implements or appurtenances necessary or desirable in shaving, together with a heating apparatus, substantially as described.

56,716.—CAR SPRING.—William F. Converse, Harrison, Ohio.

I claim the combination of the concave heads, F F', double-faced collet, A, annular elastic disks, B B', and connecting bolt, c, all constructed and arranged to operate as and for the purposes specified.

56,717.—BROOM.—E. P. Cooley, New York City.

I claim the combination of the cords, A, having knotted ends B, the conical cap, C, and pointed handle, F, with the stalks arranged and operating substantially in the manner and for the purpose herein represented and described.

56,718.—COMBINED CRADLE AND CHAIR.—Fernando E. Coomes, Berlin, Wis.

I claim as my invention the extension bottom, A A, as used in combination with the part, B, as arranged in connection with C, and the holes, F F, substantially as described and for the purposes specified.

56,719.—WATER WHEEL.—George E. Corbin and John W. Pugh, Grand Rapids, Mich.

We claim the combination of the buckets, b, and wheel, D, cylinder, E, with chutes, e, and tube, F, all constructed as described, and winged spout, G, arranged and operating in the manner and for the purpose herein specified.

56,720.—TRUNK BRACE AND HINGE.—John J. Cowell, Chicago, Ill.

I claim the hinge composed of the parts, A and B, constructed substantially as specified, when used in combination with the bar, C, the parts operating as and for the purpose set forth.

56,721.—RAISIN SEEDER.—J. B. Crosby, Boston, Mass.

I claim the employment of closely-set wires in combination with a bed or presser, for the purpose of forcing out of raisins or similar dried fruit the seeds or stones thereof, by the impalement of the pulp of the fruit on the wires as specified.

Also, in combination with the above, of seed remover, or a pulp remover, or both, arranged to operate substantially as set forth.

56,722.—MILK AND CHEESE RACK.—John G. Cross, Brattleboro, Vt.

I claim the revolving rack, in sections, and the manner of enclosing rack in screen, with ventilators at top and bottom.

56,723.—MIRROR.—P. A. Daily, New York City.

I claim the combination of the handle, A, with the metal frame, C, glass and back, when constructed as and for the purposes and substantially as described.

56,724.—WATER CLOSET.—James N. Davis, Cincinnati, Ohio.

I claim the vibratory seat, A, bearing a curved front piece, C, and side piece, c c, cover or screw, D, having arms, E E, hung to the arms, F F, with friction slide, f f, and the swinging platform, H, having levers, J J, or their equivalents, when arranged together so as to operate substantially in the manner and for the purpose described.

56,725.—FURNACE FOR SMELTING COPPER.—John Davies, Baltimore, Ind.

I claim, in furnace for smelting copper, interposing between the hearth or interior of the furnace and the descending flue that leads into the tunnel, a metallic or other equivalent stopper or plug, to prevent the molten metal, should it break through at that point, from running into and choking up the tunnel, as described.

56,726.—RAILWAY CHAIR.—Nicholas L. Davis and Robert O. Hewitt, Rutland, Vt.

We claim the method, herein described, of joining rails, and holding the same onto the ties, by the employment, in combination with chairs, C, or spikes, or their equivalent, of either of side plates, P, bolted or clamped together, substantially as herein shown and described.

56,727.—HOT-AIR FURNACE.—H. G. Dayton, Maysville, Ky.

First, I claim the concentric series of hot-air flues, a b c, in combination with the combustion chamber, e, and jacket, K, all constructed and operating substantially as and for the purpose described.

Second, The air-supply pipes, f g h, in combination with the hot-air flue, a b c, and combustion chamber, e, constructed and operating substantially as and for the purpose set forth.

Third, The water vessel, M, in combination with the concentric flues, a b c, combustion chamber, e, jacket, K, and tank, N, all constructed and operating substantially as and for the purpose described.

56,728.—CHURN DASHER.—George Deckman, Malvern, Ohio.

I claim an improved churn dasher, formed by the combination of the double concave disk, B, and the concave convex disk, C, with each other, and with the handle, A, the whole being constructed and arranged substantially as herein described and for the purpose set forth.

56,729.—SEWING MACHINE FOR SEWING BOOTS AND SHOES.—Auguste Destoug, New York City.

I claim, First, The self-adjusting table or platform for the support of the material to be sewed, the same being arranged to exert a yielding pressure against a sewing gage, substantially in the manner and for the purposes herein set forth.

Second, The combination of a wheel-feed in the adjustable platform or table, with an awl-feed, the two operating conjointly, in the manner and for the purposes set forth.

Third, I claim, in combination with a double-feed, as described, a dog to guide the work, in the manner and for the purposes set forth.

Fourth, The employment, in a sewing machine such as described, of adjustable standards to support the last, in the manner and for the purposes set forth.

Fifth, In combination with the herein described machine for sewing boots and shoes, a reservoir to contain wax, or other suitable substance, together with a heater, substantially as and for the purposes set forth.

Sixth, The thread carrier, revolving intermittently in one direction only, in combination with the hook, operating substantially as herein described and for the purposes set forth.

Seventh, In combination with the hook and awl, I claim the auxiliary needle, when constructed and arranged for operation as herein shown and described.

56,730.—FEED MOTION FOR SEWING MACHINES.—Albert L. Dewey, Westfield, Mass.

I claim the spring, E, and hub, D, applied to shaft, A, substantially as shown, and all arranged to operate in the manner and for the purpose set forth.

56,731.—WRENCH.—J. F. Dodge, Newark, N. J.

I claim the double-jawed wrench, with one pair of the jaws cut away to fit hexagonal nuts, and otherwise constructed substantially as described.

56,732.—APPARATUS FOR BLEACHING PULP AND DRYING PAPER.—Levi Dodge, Waterford, N. Y.

I claim, First, The method, substantially as herein described, of bleaching the straw or other paper stuff, in a revolving steam cylinder, and of drying the made paper, whereby these two operations are effected simultaneously in one and the same apparatus —the steam used to dry the paper on the cylinder serving at the same time to bleach the material in the cylinder, as set forth.

Second, The process herein described of drying paper in sheets, on a drying cylinder, in one revolution thereof; that is, by so regulating the velocity of the revolutions of the drying cylinder, with respect to its diameter, and the thickness of the paper operated on, that the paper being carried around the cylinder once may be dry and ready to be removed.

Third, The revolving bleaching boiler, when the same is constructed with a smooth cylindrical surface, and one or more man holes in the sides or caps of the boiler for the introduction into and removal from the boiler, of straw or other paper material, as set forth.

Fourth, In combination with the said cylinder, or boiler, I claim the use of an endless apron, or band, and doffers for operation as a drying cylinder, substantially as set forth.

56,733.—WASHING MACHINE.—Augustus L. Drake, Richmond, Me.

First, The operating of the reciprocating rubber by means of the gearing, pitman, lever, and arm, the latter being connected to or applied to the rubber by a pivot and upright guide, arranged as shown, so that the rubber may work in place, or with a rocking motion, as set forth.

Second, The drum, N, and cord, L, in combination with the reciprocating rubber, j, spring, M, and cord, L, substantially as and for the purpose specified.

Third, The crank, j, in combination with the toothed plate, O, for retaining the drum, N, in position, as described.

56,734.—MODE OF REPAIRING FILES.—A. A. Dunk, Manchester, N. H.

I claim the process of sharpening and renewing files, substantially as above described, by covering the tops of the teeth only with a protecting coating, and then immersing the file in acid until the intervals are sufficiently deepened.

56,735.—ANIMAL TRAP.—A. Ellis and O. Albertson, Salem, Ind.

We claim the arrangement of the connecting rods, C C, platform, G, with its spring, H, shouldered spring-arm, I, trap door, O, and arm, F, with the boxes, A and M, operating in combination with the swinging doors, B, all constructed substantially in the manner and for the purpose herein specified.

56,736.—MACHINE FOR FORMING PLOW HANDLES.—W. A. Ellis, Ashtabula, Ohio.

I claim the groove, a', made adjustable by the removable piece, I, in combination with the sliding frame, B, and revolving cutter, arranged and operating substantially as described.

56,737.—PAPER CUFF OR WRISTBAND.—Andrew A. Evans, Boston, Mass.

I claim, as a new article of manufacture, a wristband or cuff, made of long fiber paper, substantially such as is above described.

I also claim making said wristband or cuff reversible, substantially as and for the purpose described.

56,738.—STEAM CONDENSER.—John K. Ferguson, Portland, Ky.

First, I claim the cylinder, B, provided with a series of perforated pipes, C C, and valves, D D', and used with the exhaust pipe, A, and cold water pipes at a, substantially as and for the purpose specified.

Second, The box, E', provided with a series of chambers and valves as described, when used with the cylinder, B, and force pumps, M and L, substantially in the manner and for the purpose set forth.

56,739.—HORSE HAY FORK.—Henry Fisher, Canton, Ohio.

I claim the bars, A and B, with crooked points, being provided with the lever, C, when arranged and used substantially as and for the purpose herein set forth.

56,740.—BED BOTTOM.—John Flinn, Philadelphia, Pa.

I claim, in combination with a bed bottom, spiral spring, B C, extending and bending the wire of the bottom coil, b', of the same, so as to produce the spring clamps, b1 b2 c' c1 c2, substantially in the manner described and set forth, for the purpose specified.

56,741.—SPRING-BED BOTTOM.—A. Frazee and L. W. Smith, Canandaigua, N. Y.

We claim the combination and arrangement of the cross-bars, C C, cleats, E E, elastic bands, G G, and loop hooks, D D and H H, substantially as and for the purpose herein specified.

56,742.—PROCESS FOR MAKING BRICK.—Isaac H. Garretson, Richland, Iowa.

I claim making brick, tile, and similar articles, by the "tamping" process—that is to say, by feeding in the clay or other material in small quantities, and tamping or beating each small quantity, thus fed in, before any more material is added, as herein set forth.

I also claim the mechanism, constructed and operating substantially as herein described, for the purpose of making brick and similar articles.

56,743.—STRAW CUTTER.—Alexander Gordon, Rochester, N. Y.

I claim the relative arrangement of the spring, s, with the yoke, y, the latter being pivoted to the frame of the machine by the pivots, g, which are located at a point intermediately between the bar, c, and the pivots, f, to which the supporting bars, r, are hinged, for the purpose set forth, the parts acting conjointly, in combination with the upward cut.

56,744.—WASHING MACHINE.—William Gowen, Warsaw, Wis.

I claim the washing machine, constructed as herein described, with cross-bar, D, sliding rods, e e, sockets, d, springs, f, shaft, c, and rubbers, B b, all combined and arranged to operate substantially as and for the purpose set forth.

56,745.—DIES FOR MAKING SQUARE BOLT HEADS.—James Gribben, Alleghany, Penn.

I claim the use of dies for making square-head bolts, the heading cavity of which is enlarged, at two opposite corners, beyond the dimensions of the bolt-head to be formed, while the two remaining corners are of the required shape and dimensions, or distance apart, in combination with a heading tool or plunger, so shaped as to fit closely into or against those last-named corners, while the remaining corners of the heading tool or plunger are enlarged, substantially as and for the purpose hereinbefore set forth.

56,746.—CUPOLA AND BLAST FURNACE.—John R. Grout, Detroit, Mich.

First, I claim constructing the boshes, B, of a cupola or blast furnace with metallic chambers, g, so arranged that a current of cold water may flow through them, and without an internal lining of fire-brick, or other refractory substance, substantially in the manner and for the purposes set forth.

Second, So arranging two or more chambers, g, in combination with the flanges, b and d, and plate, e, that the chambers surrounding the boshes may be removed without destroying the superior brick work, c, substantially as set forth.

56,747.—SORGHUM STRIPPER AND CUTTER.—C. L. Hart, Mattoon, Ill.

First, I claim the use of the plate, A, in a sorghum stripper, when perforated, substantially in the manner herein described and for the purpose set forth.

Second, The frame or covering, B, and spring bars, C, in combination with each other, and with the perforated plate, A, substantially as described, and for the purpose set forth.

Third, The stripping tubes, D, constructed and arranged as herein described, in combination with the spring bars, C, and with the perforated plate, A, substantially as described, and for the purpose set forth.

56,748.—STEAM GENERATOR.—David Greene Haskins, Cambridge, Mass.

First, I claim the combination of a series of perforated pipes with the exterior or heating surfaces of steam generators for the purpose of utilizing gases in the generation of steam, substantially as herein described.

Second, I claim the combination of the boiler, A, with the tubes, B B, and series of pipes, a and b, substantially as and for the purpose specified.

Third, I claim the combination of the boiler, A, the casing, E, and interposed series of pipes, b, substantially as and for the purpose specified.

56,749.—SICKLE HEAD FOR HARVESTER.—Milton H. Hilburn, Wilmington, Ill.

I claim a sickle head to be used in mowers and reapers, constructed substantially as described, with the conical jurnals, d d, upon the lug, C, in the manner and for the purpose specified.

56,750.—PAINT BRUSH.—Emil Hiss, Delaware, Ohio.

I claim a paint brush, provided with an adjustable draw-band, C, substantially as and for the purpose specified.

56,751.—ROOFING.—Joseph F. Hodgson, Washington, D. C.

First, In the construction of metallic roofing I claim securing the edges of the sheets of metal in dovetail grooves by means of a fusible metal, substantially as described.

Second, The use of blocks, B, having beveled edges applied to the sheathing of the roof for the purpose of supporting the sheets of metal, and forming dovetail grooves for receiving the edges of said sheets, and also the fusible metals, substantially as described.

56,752.—TOBACCO PIPE.—Edwin Hoyt, Stamford, Conn.

I claim the sliding perforated tube, E, in combination with the perforated diaphragm, C, tube, D, and bore, a, substantially as and for the purpose specified.

56,753.—SPRING SEAT FOR CARRIAGES.—Francis M. Hubbard, Ripon, Wis.

I claim a device for giving elasticity to the seats of vehicles by means of the levers, D D, fulcrums, C, and elastic bands, E, combined and arranged substantially as and for the purpose set forth.

56,754.—CONSTRUCTION AND RIGGING OF TRESTLE TREES FOR VESSELS.—John M. Hudson, New York City.

I claim the placing below the upper trestle trees, A, a new pair of trestle trees, B, on the lower mast, X, with the projections, D, on the ends, and securing the trestle trees, B, with the iron band, U, and extending the top mast, Y, so that the heel, C, with fid, P, going through the heel, C, will rest on trestle tree, B, and take against the projections, D, instead of resting on the trestle trees, A, which now opens with the iron gate, F, to facilitate sending the topmast, Y, up and down, substantially in the manner as herein described.

I also claim the bridle band, E, over the masthead, as herein described.

I also claim the combination of the foregoing with the clew lines and spilling lines, for the purposes and objects herein described.

56,755.—FRUIT JAR.—William Hunt, New York City.

First, I claim the within described preserve can composed of a body of pottery ware and a cover of vitreous material, fitted to each as shown, and adapted to withstand the temperature of filling and to exhibit the contents without opening the can, substantially as herein set forth.

Second, I claim the ears, a a, arranged on the neck or contracted of a pressure can, substantially in the manner and so as to form attachments for the links, D, as herein set forth.

Third, I claim the flexible links, D, adapted to operate in connection with the turning key, E, or its equivalent as described when said links are permanently attached so as not to be lost on unsealing the can, and are hinged so as to be turned down when out of use, substantially in the manner and for the purpose herein set forth.

Fourth, I claim the flat turning key, E, having portions cut away at c, in combination with a pressure can, A, and cover, B, and arranged to induce two different pressures upon the cover, by turning upward one edge or the other of the key, as and for the purposes herein set forth.

56,756.—DUMPING CAR.—Edward H. Jackson, Boston, Mass.

I claim, First, Attaching to the sides of a dumping car a hub or projection, D, as and for the purpose substantially as specified.

Second, I also claim the combination of a dumping car provided with a hub or projection D, on either side, with a frame, B, substantially as and for the purpose specified.

56,757.—SPRINKLING SYRINGE FOR GARDENS.—A. L. Jewell, Waltham, Mass.

I claim as my invention or improvement the combination and arrangement of the foraminous valve, its opening and seat with a syringe, the same being to operate substantially as described.

56,758.—WOOL-OILING MACHINERY FOR CARDING MACHINES, ETC.—Charles Jones, Boston, Mass.

First, In combination with carding or other kindred wool-preparing machinery and arranged over the feed apron of the same, I claim a dripping oil tank having a transverse motion with respect to the line of feed of the wool, substantially as set forth.

Second, In combination with carding or other wool-preparing machinery and arranged over the feed apron of the same, I claim a dripping oil tank having both a transverse motion with respect to the line of feed of the wool and a rotary movement, substantially as set forth.

56,759.—MANUFACTURE OF SHEET AND BAR IRON.—Jonathan M. Jones, East Taunton, Mass., Barnerd Spaulding, Port Richmond, N. Y., and Sylvester Parkins, Providence, R. I.

We claim the improved process for the manufacture of iron, substantially as herein described and for the purposes set forth.

56,760.—RAILROAD RAIL.—Robert V. Jones, Canton, Ohio.

I claim the top rail provided with a tongue, E, upon each side of which are V-shaped grooves, said tongue being made concave, on its side below its center and decreasing in size or width from z z, to a a, when used with the flanges, D D, with beveled edges, and straight sides, substantially as and for the purpose herein specified.

56,761.—WASHING MACHINE.—Wm. and A. G. Kelsey, Delevan, Wis.

We claim the combination of the hinged roller block, a a, and the swinging rubber, c, with the wash tub, A A, for the purpose of converting it when desired into a rinsing tub, arranged and operated as herein specified.

56,762.—BRIDLE BIT.—Samuel M. King, Lancaster, Pa.

I claim the extended ends, D, constructed with grooved rollers, E, and round aperture, J, as herein described and for the purposes set forth.

56,763.—BILGE WATER GAGE.—William P. Kirkland, San Francisco, Cal.

I claim, First, The aprons, C, applied to the perforated star board and bar board sides of the box, A, substantially as and for the purpose described.

Second, The disk, f, of glass or other suitable material in combination with the float, B, and index rod, g, constructed and operating substantially as and for the purpose specified.

56,764.—SAD IRON.—Christian F. Knauer, and Wm. Warwick, Pittsburg, Pa.

We claim the method of constructing sad irons, substantially as herein specified and set forth.

56,765.—METHOD OF PREPARING GOLD FOR DENTISTS.—Emile Lamm, New Orleans, La.

I claim the use of saccharine substances to precipitate gold from its solutions in the manner and by the process above described, or by any substantially equivalent process, thereby forming a mass of chrystal shreds, extremely useful and convenient for dental and other purposes.

56,766.—FIELD FENCE.—John W. Lamore, Harrison, Ohio.

I claim, First, The metallic post, A, having the vertical series of flexible ears or clips, D, to receive and secure the wires in the manner described.

Second, A field fence composed of the following elements, to wit: a metallic post, A, having a bottom tenon, B, to enter a stone foot or base, F, and a top tenon, C, to enter a wooden rider, G, and having a series of ears or clips, D, for the reception of suitable wires, E.

56,767.—BELT COUPLING.—Worley Leas, Kokomo, Ind.

First, I claim a belt coupling consisting of a link, D, and bent metallic plates, E E, connected together so as to form a joint at each side of the link, substantially in the manner specified.

Second, I claim the rib or bank, D', formed on the link, D, and employed to form a continuous bearing for the leather as described.

Third, In combination with a belt coupling constructed as herein described, I claim the leather covering F F', and G, to prevent slipping when the coupling is upon the pulley.

56,768.—QUARTZ CRUSHER.—A. Lindsay, Malone N. Y.

I claim, First, The combination of the rollers, E, with the axles, e, pins, f, and upright shaft, B, substantially as set forth and in the manner described.

Second, The combination of brushes or scrapers, G, with bars, g and g', springs, g'', friction rollers, g''', rollers, j' and cams, j, substantially shown and described.

Third, Returning the coarse quartz to the crusher by means of sieves or separators, n, trough n', box, M, endless apron, N, hopper, J, and pipe, t, substantially as shown and described.

Fourth, The devices for raising and lowering the brushes or scrapers, e, consisting of cam, j, rod, l', shell l'', and spiral spring, l''', substantially as herein shown and described.

56,769.—TABLE AND STOOL.—Henry Loth, Philadelphia, Pa.

I claim the described folding table or stool, having its three legs, C D E, and top A B, combined as shown and relatively arranged to fold up in the order and for the purpose set forth.

56,770.—EXTINGUISHER AND REGULATOR FOR LAMPS.—C. E. Lyon, Worcester, Mass.

I claim, First, A lamp burner provided with a combined regulator and extinguisher, substantially such as herein described, as a new article of manufacture.

Second, I claim the sleeve, C, adapted to act separately as a regulator and in combination with the cap, E, as an extinguisher.

Third, The cam shaft, D, and hook, c, with its shoulder, d, in combination with the sleeve, C, wick tube, B, and cap, E, constructed and operating substantially as and for the purpose described.

56,771.—GEARING FOR CHURNS.—Alvin C. Mason, Springfield, Vt.

I claim, First, The gear wheel, B and H, in combination with the pinion, I, so that the motion of the beaters may be reduced or accelerated for the purpose and substantially as described.

Second, I claim the plate, D, or its equivalent in combination with the wheels, B and H, and pinion, I, substantially as herein set forth.

56,772.—OPERATING HAND PUNCHES, SHEARS, ETC.—Wm. B. Mason, Boston, Mass.

I claim the above described machine for operating punches, dies, shears, etc., the combination and arrangement of the levers, A and B, with the link, C, substantially as described.

56,773.—CLOTHES WASHER.—Ariadna B. Mercier, Providence, R. I.

I claim the combination of a perforated plate with a stopper in the manner set forth and for the purpose specified.

56,774.—STOVEPIPE DRUM.—B. F. Miller, New York City.

I claim the radiating drum, c d, and interior chamber, e, with the pipes, g h, constructed substantially as and for the purposes specified.

56,775.—ATTACHING BURNERS TO LAMPS.—Warren P. Miller, San Francisco, Cal.

I claim the application of the grooved shank, c, as shown at d, the socket, b, and springs, a, or their equivalent when made to operate substantially in the manner described.

56,776.—POCKET TABLET.—J. A. Minor, Middletown, Conn. Antedated July 19, 1866.

I claim a case for a pocket calendar constructed with two elastic or yielding sides, a a, one of which is provided with a pin, d, to pass through and secure a series of cards, B, to the case so that said cards may be turned within and out from the case and readily adjusted to and detached from the same, substantially as described.

I also claim the rounded back, p, when used with the yielding or elastic sides, a a, to serve as a socket for the pencil, c.

I claim the blank, A, as represented in Fig 4, for the purpose specified.

56,777.—BRIDGE.—David A. Mitchell, Chicago, Ill.

I claim, First, Suspending the draw for bridges from trucks which run on a railway supported on frame work by suspension cables on towers, placed either above or below the frame work, at a height sufficient to allow steamboats and other river crafts to pass freely under the structure that supports the draw as herein described.

Second, I claim the collar braces, F F, constructed and arranged as and for the purposes specified.

Third, I claim so placing the stirrups, suspension rods, and angular braces, that the strain upon the draw and the other portion of the bridge structure is equalized upon the suspension cables, in the manner and for the purpose herein set forth.

56,778.—STEAM GENERATOR.—Thomas Mitchell, Albany, N. Y.

I claim the arrangement of the stem, B', and beam, C C, of Fig. 3, and cock, B, of Fig. 2, substantially as and for the purpose set forth.

56,779.—CORRUGATED METALLIC PLATES.—Richard Montgomery, New York City.

I claim the plate or plates of rolled wrought metal doubly corrugated, substantially as described.

56,780.—APPARATUS FOR COOLING MILK.—J. Owen Moore, Washingtonville, N. Y.

I claim, First, Forming a spiral channel for the purpose set forth by inserting a coiled wire, a, between the walls of the vessels, B and C, substantially as shown and described.

Second, An apparatus for cooling milk or other liquids, formed by combining with each other the vessels, A B and C, pipe, e f and h, trough, I, strainer, k, coiled wire, a, and pipe, g, substantially in the manner and for the purpose herein shown and described.

Third, Constructing a cooling apparatus in such a manner that the cooling liquid may overflow from the inner vessel, C, to the outer vessel, A, without coming in contact with the milk contained in the intermediate vessel, B, substantially as and for the purpose shown and described.

Fourth, The combination of the annular trough, I, with the strainer k and vessels B and C, substantially as described.

56,781.—POLISHING BOX.—William A. Moore, Philadelphia, Pa.

I claim a polishing pad substantially as described in combination with a box having a perforated lid for the purpose specified.

56,782.—BEE HIVE.—M. D. Mulford, Jr., New Providence, Iowa.

I claim, First, The hive, A, having its top and bottom inclined as shown, with its lower walls made double, and provided with the movable frames, C, having their top bar inclined as set forth.

Second, The additional mouth piece, c, provided with the opening m, in combination with the piece, a, having the opening, m, when said pieces are arranged in relation to each other, and to the hive as shown and described.

56,783.—PORTABLE APPARATUS FOR HEATING AND MELTING ROOFING MATERIAL.—John Munn, Columbus, N. J.

I claim, First, The pan, B, and fire box or cylinder, C, so arranged relatively to each other as to form an intervening air chamber c, between them, whereby the air is heated and applied to the pan instead of a direct flame as heretofore, substantially in the manner and for the purpose as herein set forth.

Second, The sliding valves, F F, in combination with the box, A and air chamber, c, for regulating the degree of heat in its application to the pan by the admission of cold air, substantially in the manner as described.

Third, The arrangement of the pipe, D, the fire box, C, and pan, B, substantially in the manner and for the purpose as described.

56,784.—CONDENSING STEAM.—F. Murgatroyd, Cleveland, Ohio.

I claim, First, The chamber, D, funnel-shaped pipe, B", and valve, e, combined with the device for discharging bilge water, arranged in the manner, and for the purpose set forth.

Second, The arrangement of the connecting rod or link, d, cranks, h and b, and valves, e a, for the purpose of automatically exhausting into the chamber, D, below the water line, or out board, according to the direction of the vessel, in manner and for the purpose described.

Third, The chamber, D, funnel-shaped pipe, B, and valves, e a, combined with a device for discharging bilge water, as and for the purpose set forth, below the water line.

56,785.—BUCKLE.—Nicholas Murphy, Washington, D. C.

I claim the combination and arrangement of the two pieces, A and B, when the tongue, a, and pivots, b, are arranged as specified, substantially as and for the purposes set forth.

56,786.—SASH FASTENING.—H. Naylor, Pekin, Ill.

I claim the combination of the catch, C, with its head, b, and spring, d, arranged with the piece, a, applied and operating substantially as specified.

56,787.—HOOP SKIRT.—Cæsar Neumann, New York City.

I claim the hoop skirt having its wires arranged in sections or clusters, each section comprising two or more wires placed near together, in separate pockets, substantially as described, as a new article of manufacture.

56,788.—WOOD-BENDING MACHINE.—Joseph Newman, Falmouth, Maine.

I claim operating the mold, G, or form for bending, by means of the metallic bending strap, f, which is attached to the mold at one end and to the reciprocating rack, g, at the other, all constructed to operate substantially as described.

56,789.—STOVEPIPE DAMPER.—William H. Nutting, Orange, Mass.

I claim the combination and arrangement of the series of starts, d d d d, and the series of notches, g' g' g' g', with the damper and register slide, and the swell, D, and the journal, C, applied to the damper, as set forth.

56,790.—SAFE LOCK.—Alfred A. Oat, Philadelphia, Pa.

First, I claim the interlocking spring slides, 2, and 5 7, and 11 13, and 15 and 18, constructed and arranged in relation to each other, and to the sliding blocks, K K K K, which are respectively connected to the sliding spring stops, F F F F, substantially in the manner described for the purpose of operating the said stops, and thus fixing and releasing the said main bolts E E E E, of the lock, as described.

Second, I claim securing the plug, 2, in the plate, B, of the lock, by means of the interlocking spring slides, 1 3 4 6 8 9 10 12 14 17, when the same are arranged in relation to each other, and to the interlocking spring slides 2 and 5 7 and 11 13 and 15 and 16 and 18, substantially as described and set forth.

Third, I claim retaining or fastening the plug 1', in the plate, C, by means of the rack bolt, J, operated by means of the pinion, j4, spring, j5, and spring slide, 19, substantially as described and set forth.

Fourth, I also claim securing, releasing, and supporting in its retired position, while holding back the four main bolts, E, as described, the retracting plug, O, by means of the two spring bolts, J' J', cam, j3, and slide, 20, the same being constructed and arranged to operate together substantially as described.

56,791.—MANUFACTURE OF INITIAL STUDS.—Abraham W. Overbaugh, New York.

I claim the application of the changeable initial plate in the manufacture of buttons, pins, ear-rings, and other jewelry or ornaments generally, as herein above described.

56,792.—WATER COOLER.—George T. Palmer, Brooklyn, N. Y. Antedated July 20, 1866.

I claim the reservoir, c, cooler, d, and pipes, g g, combined and arranged substantially as and for the purpose shown and described.

56,793.—QUARTZ CRUSHER.—Henry Pearce, San Francisco, Cal.

I claim the construction of a conically-shaped crushing mill with an eccentric motion as herein described, for the purpose and in the manner substantially as set forth.

56,794.—CORSET.—Samuel M. Perry, Plainfield, N. J. Antedated July 20, 1866.

I claim a corset having one or more jointed clasp plates, so constructed essentially as herein specified, that the top ends of said clasp plates may swing outward and downward when the tops of said plates are unlocked and afford a ready access to the parts of the wearer's person thereby exposed, while the bottom ends of said clasp plate serve to clasp the corset sufficiently when the top is unlocked.

56,795.—TOBACCO PIPE.—J. W. Petty, New Orleans, La.

I claim the combination of the sections of the bowl and stem, A d, and of the mouthpiece, e, with the framework, a b c f1, when the several parts are constructed and united as described, for the purpose set forth.

56,796.—STEAM GENERATOR.—William Phelan, Peoria, Ill.

In combination with an outer jacket, I claim the removable arrangement of fire-box, double set of flues, and flue chamber, O, so attached to the outer shell as to permit the space between them to be used as a water and steam chamber, I.

In combination with the said shell surrounding the said removable arrangement, I claim steam chambers, A B, on the sides of the boiler, substantially as described.

56,797.—APPARATUS FOR PURIFYING AND DEODORIZING WHISKY, ETC.—E. F. Prentiss, Philadelphia, Pa., and C. C. Parson, Boston, Mass.

I claim, first, the distributor, H, constructed and arranged in the manner and for the purpose substantially as shown and described.

Second, The shield, F, constructed and arranged in the manner and for the purpose substantially as shown and described.

Third, The pipe, b, arranged and operating in the manner and for the purpose substantially as shown and described.

Fourth, The trap tube, a, provided with a distributor, H, and the cask, C, containing neutral materials, in combination with the shield, F, and the pipe, b, or their equivalents respectively, substantially as described, the whole to be used in connection with a still.

56,798.—PLOW.—Benjamin Price, Leesville, Ohio.

I claim the jointed beam, A A', attached to a front and rear mold-board, and points or hill-side plow, constructed and operating substantially in the manner and for the purposes set forth.

56,799.—VENTILATOR AND SHADE FOR LAMP.—Karl Recht, New York.

First, I claim the valve arranged and described substantially.

Second, The combination of the valve and shade with the ventilating tube as constructed.

56,800.—PROTECTOR FOR CORNERS OF STAIRS AND ROOMS.—Henry C. Richards, Cincinnati, Ohio.

I claim, as an article of manufacture, the corner protector, constructed of metal, wood, or other suitable material, as and for the purpose herein described.

56,801.—TRAVELING BAG.—William Roemer, Newark, N. J.

I claim a frame for traveling bags, having staples, J, and strap, E, adjusted on the top thereof, relieving the lock from strain as described, constructed, combined, and arranged as herein specified.

56,802.—STEERING APPARATUS.—Edward Rowze, Augusta, Maine.

I claim the arrangement of the rib, c, ropes, f f, sheaves, i i, tiller, b, pulleys, K, and rudder head, B, with its pivoted stud, d, operating in combination with the windlass, E, in the manner and for the purpose herein specified.

56,803.—HOOP SKIRT.—Julius Schleisinger, New York City.

I claim, first, The combination of the adapter, E, with the hoops, B B', and strips, a, constructed and operating substantially as and for the purpose described.

Second, Turning the ends of the hoops, B', up and securing them to the strips, a, substantially as and for the purpose set forth.

56,804.—REVOLVING CARTRIDGE BOX.—P. F. Schneider, Hartford, Conn.

I claim, first, The stationary bridge, W, in combination with the casing, D, and sections, F E, arranged relatively with the discharge opening, V, applied and operating substantially as and for the purpose represented and described.

Second, In combination with the shaft, I, and sectional tube cylinder, C', the ratchet wheel, M, spring pawls, N O, and lever, Q, constructed and operating substantially as described for the purpose specified.

56,805.—SEWING MACHINE.—M. Schwalbach, Milwaukee, Wis.

First, I claim the combination of the take-up rod, d, with the needle bar, when it is rigidly fastened to a rotating pin or pivot placed in the top of said bar, and loosely fitted to slide in a rotating pin or pivot placed on a standard, r, substantially as and for the purpose above described.

Second, I also claim the elbow feeding lever, N, carrying an adjustable feed propelling screw at its upper end, and having curved branches, O F, on its lower end, between which the crank pin of the shuttle carrier vibrates, substantially as set forth.

Third, I also claim the combination of the shuttle carrier, the feeding plate, R, and the elbow lever, N, the whole operating in conjunction substantially as described.

Fourth, I also claim the plate, V, constructed substantially as above described, for holding up to the curtain, U, the shuttle carrier for holding the feed plate, R, in proper position, and for moving the feed plate backward when it is in its lowest position, substantially as described.

56,806.—SHOE STRING FASTENER.—Eliphalet S. Scripture, Williamsburg, N. Y.

I claim a shoe string fastener, composed of a tilting spring button, A, corrugated spring washer, B, and rivet, C, substantially as and for the purpose set forth.

56,807.—METHOD OF COMPRESSING, CONDENSING, AND EXTENDING METALS.—John F. Shearman, Brooklyn, N. Y.

I claim, first, the percusso condensation or extension, or both together, of solid or hollow bodies, commonly called hammering, when effected by the intervention of practically non-elastic fluids or liquids between the hammer and the body to be operated on, substantial y as set forth.

Second, I claim the operation of the hydraulic hammer whether it be applied to change or not to change the shape of the article to be treated.

56,808.—LOCK.—George A. Sherlock, Boston, Mass.

I claim the application of each or either of the locks, G H, to the knob spindle of the spring bolt, B, so as when the bolt, g, of the lock is thrown forward, it shall lock the spindle or prevent it from being revolved by force applied to either of the knobs.

I also claim the combination of the spring bolt and its spindle with two isolated locks arranged on opposite sides of the door, and constructed in the manner and so as to operate with the spindle, substantially as specified.

56,809.—LOUNGE.—Abraham & David Short, West Liberty, Ohio.

We claim the combination of the leg, C, rod, D, and pawl rod, E, with the back, A', for adjusting the position of the latter, substantially as shown and described.

56,810.—CAR STARTER AND BRAKE.—Thomas R. Sinclaire, New York City.

First, I claim the employment or use of the collars, Q Q, one or more placed on the shaft, F, in combination with the nut, P, and the screw, g, on shaft, F, substantially as and for the purpose set forth.

Second, The clamps, R R, with or without the teeth, i i, one or more in combination with the collars, Q Q, and nut, P, all placed on shaft, F, and arranged substantially as and for the purpose specified.

Third, The arched bars, b b, in combination with the frame, E, shoe or brake levers, S, and arms, l, all arranged in the manner and for the purpose specified.

Fourth, I claim the pivots, c, in combination with the levers, J, and arched bars, b, substantially as and for the purposes stated.

Fifth, The shoe levers, S, applied to the frame, E, as shown, and provided with springs, Z, and stops or pins, n, substantially as and for the purpose set forth.

Sixth, The eccentrics, A', applied to the springs, Z, for the purpose of graduating their pressure, as described.

Seventh, The operating of the shoe levers, S, from the shafts, W, by means of the chains, Y, rods, U X, chains, Y, and pulleys, m m, all arranged to operate substantially in the manner and for the purpose specified.

Eighth, An elastic lever, J', in combination with the lever, J, substantially as and for the purpose set forth.

Ninth, In combination with the levers, J J', I claim the draught hooks, O, constructed in the form of a fork, or branched to admit of the levers, J', passing them as described.

56,811.—BUCKLE.—Earle A. Smith and Dwight L. Smith, Waterbury, Conn.

We claim the combination of the bar, c, of the lever with the bar, B, of the frame, whether the eye parts of the hinges are on the lever part (as in Figs. 1 2 and 4), or on the frame part (as in Figs. 5 6 and 7), when the bar, c, is made to pinch the running part of the strap between itself and the edge, or reverse, or under corner of the central bar, B, of the frame, and the buckle is constructed and fitted for use, substantially as herein described and set forth.

56,812.—SCUTTLE.—George Smith, Brooklyn, N. Y.

I claim a coal scuttle composed of three removable parts, when constructed and arranged substantially as and for the purpose herein described.

56,813.—WEATHER STRIP FOR DOORS.—John A. Smith, Wapuca, Wis.

I claim a threshold weather strip made of the two parts, a and b, with edges convex and concave, as described, when united by hinges operating also as springs, substantially as specified.

56,814.—PAINT.—Rees B. Smith, Mount Pleasant, Ohio.

I claim the compound as a new and useful composition for paint.

56,815.—COMPOSITION FOR WELDING AND BRAZING.—Rees B. Smith, Mount Pleasant, Ohio.

I claim the fluxing or welding composition substantially as described.

56,816.—HEATING APPARATUS.—Sidney Smith, Greenfield, Mass.

I claim First, a fire chamber constructed in accordance with the principles, and substantially in the manner herein set forth.

Second, The combination of the perforated walls, A and G, constructed as described, to form a fire chamber.

Third, The combination of the perforated walls, A and G, with the close bottom, B, substantially as and for the purpose set forth.

Fourth, The combination of the perforated walls, A and G, with the partition, E, and damper, M, substantially as and for the purpose set forth.

56,817.—COMPOSITION FOR FACING MOLDS.—Rees B. Smith, Mount Pleasant, Ohio.

I claim the composition above described, as a "facing" powder, for use in the process of casting.

56,818.—COMPOSITION FOR ROOFING.—Rees B. Smith, Mount Pleasant, Ohio.

I claim the composition for roofing, consisting of the ingredients in about the proportions described.

56,819.—PEG HOLDERS.—William H. Smith, Sparta, Wis.

I claim the hoops, E, and hinged hopper, C, arranged to operate substantially as set forth.

56,820.—MORTISING MACHINE.—Jerome B. Stark, Fisherville, N. H.

I claim the feeding mechanism or combination as described, the same consisting of the two racks, e f, the pawls, p p, the pawl levers, E F, the lifter, G, and the cords, r r, the whole being arranged and applied as explained to the supporter, B, the frame, C, the chisel shaft, and its operative lever, connected with the said shaft by means of the recessed block, K, and the spring catch, as specified.

56,821.—SAFETY POCKET.—P. A. Stecher, New York City.

I claim, First, The partition seam, a, and rounded or inclined seam, b, in combination with the pocket, A, and its mouth, B, substantially as and for the purpose described.

Second, The recess, d, in combination with the stop, D, and pocket, A, constructed and operating substantially as and for the purpose set forth.

56,822.—BOG CUTTER.—Charles E. Steller, Chicago, Ill.

I claim, First, The frame, A A' B B', constructed and arranged substantially as and for the purpose set forth.

Second, The arrangement of the cutters, D, in four or more transverse rows, two of the rows inclining to the right and rear in alternation with two inclining to the left and rear, the rear rows cutting through the spaces left by the front rows, substantially as set forth and shown.

Third, The combination of a frame, A A' B B', constructed substantially as specified, with transverse rows of obliquely placed cutters, or cutter teeth, the rows inclining alternately to the right and left, substantially as set forth and shown.

Fourth, The combination and arrangement of the brace bars, C, the beams or bars, A A' B B', and the oblique cutter teeth, D, substantially as shown, set forth and specified.

56,823.—DRYING APPARATUS.—Andrew Stevens, West Milton, Ohio.

I claim, First, The arranging the cleats, I, and trays, J, of a drying apparatus, so that they may form one side of a hot air flue, L, as described.

Second, The vertical cold air passage, H, when placed between the smoke pipe and housing of a drying apparatus, substantially as described, for the purpose set forth.

Third, I claim in the described combination the vertical cold air passage, H, smoke pipe, E E' F, and the concave deflecting plates, D and G, arranged and operating as explained.

Fourth, The horizontal branch, F, when arranged to pass between two sets of drying trays, as and for the purpose set forth.

56,824.—PRESS FOR CIDER MILL.—Michael Stevens, Smithville, Ohio.

I claim the conducting board, H, when constructed and used in a press box, substantially as described and for the purposes set forth.

56,825.—MACHINE FOR ROLLING METAL.—A. C. Stone, Steeleville, Pa.

I claim the combination of the dies, D D, with the rolls, C C, constructed and operating as described and for the purposes already set forth.

56,826.—FENCE.—John Stone and Samuel Blocker, Sr., Plattsburgh, N. Y.

I claim, First, The construction, combination and arrangement of the sills, A, uprights, B, braces, G, and wedges, D and H, with each other, substantially as described and for the purposes set forth.

Second, The combination of the horizontal bars, C, and blocks, E, with each other and with the upright bars, B, substantially as described and for the purpose set forth.

Third, The combination of the keys, F, or equivalent, with the upright bars, B, and with the upper horizontal bar, C, substantially as described and for the purpose set forth.

56,827.—PAPER COLLAR.—Samuel S. Stone, Troy, N. Y.

I claim, First, A paper or combined paper and cloth turn-over shirt collar, having its neck band, B, slitted in the manner substantially as and for the purpose set forth.

Second, A turn-over shirt collar of paper, or paper and cloth combined, having only the exterior surface of turn-over part, A, colored or ornamented, as specified.

Third, The slitted neck band, B, provided with button holes, C, of the form shown, substantially as and for the purpose specified.

56,828.—ADJUSTABLE LOCK KEEPER.—Turner Strobridge, Pittsburg, Pa.

I claim, First, The oblong or slotted screw holes, b b, when used for the double purpose of adjusting a keeper, and fastening the same to the casing of the door.

Second, The combination of a movable face plate and stationary body of a keeper with slotted and regular screw holes, and ratchets or stops forming a keeper, substantially as shown and described.

56,829.—SELF-ACTING MULES.—James Sutherland, East Hampton, Mass.

I claim First, Controlling the ascent of the faller wire in spinning machines by the resistance of a body of confined air, substantially as above described.

Second, I also claim in combination the cylinder, E, having its lower end open and a valve applied to its upper end, the lever, I, and the arm, B, projecting from the shaft of the faller wire, C, substantially as described.

Third, I also claim the combination of the tripping rod, H, with the piston, T, table, G, and the arm, B, of the faller wire shaft, substantially as described.

Fourth, I also claim the screw rod, R, and nut, G, in combination with the tripping rod, H, and lever, I, substantially as described.

Fifth, I also claim the screw rod, R, and nut, G, in combination with the piston, whose stroke is shortened by the rising of the nut, substantially as described.

Sixth, I also claim the combination of the arm, B, of the faller wire shaft with the tripping rod, H, and lever, I, substantially as described.

56,830.—Wash Boiler.—Mary A. Taylor, Cincinnati, Ohio.

I claim a plurality of receptacles, D F, each constructed with a perforated bottom and adapted to fit within a wash boiler and operate in connection with each other in the manner and for the purposes herein described.

56,831.—Trues.—Charles Wesley Thompson, Batavia, Ill.

I claim, First, Making a truss pad of two separate pieces secured side by side to a plate on which they are allowed to oscillate, substantially as set forth.

Second, I also claim the screw threaded curved arm, D, passing through a guide and stop, G, and having a nut, F, thereon, substantially as described.

56,832.—Process for the Manufacture of Paper Stock.—Joel Tiffany, Albany, N. Y.

I claim, First, The employment of pressure obtained by forcing into the vessel containing the stock to be treated, air cold or hot, so as to obtain any degree of pressure necessary to force the caustic liquor into contact with every part of the stock, in combination with the caustic liquor so used, substanntially in the manner and for the purpose above set forth and described.

I claim, Second, The use of condensed cold air forced into the vessel containing stock producing the necessary internal pressure upon the stock by heating and expanding the air within the vessel, in combination with the caustic liquor so used, substantially in the manner and for the purpose above set forth and described.

56,833.—Bleaching Paper Stock.—Joel Tiffany, Albany, N. Y., and Harrison B. Meech, Fort Edward, N. Y.

We claim the process of bleaching paper stock under pressure produced by forcing a weak chlorine gas, with or without atmospheric air, into a close vessel containing the stock, in combination with the use of a solution of chlorine with which the stock to be bleached is saturated, substantially in the manner and for the purpose above described.

56,834.—Paddle Wheel.—C. A. Todd, New York City.

I claim the arrangement of the curved floats, B C, in combination with the radial arms, D, constructed and operating substantially in the manner and for the purpose specified.

56,835.—Water Wheel.—Jesse Tucker, Adrian, Mich.

I claim a horizontal water wheel provided with a bottom having a series of inclined issues, D, and also provided with an upright rim or flange, E, having a series of curved taper issues, F, in connection with the conical hub, G, on shaft, B, and the cylinder, A', over the wheel, all arranged substantially as shown and described.

56,836.—Safety Attachment for Gas Pipe.—L. W. Turrel, Samuel Stanton, and L. C. Ward, Newburgh, N. Y.

I claim the combination of the gauze disks, C C C, rings, D D, and coupling, A B, arranged and applied in the manner and for the purposes specified.

56,837.—Car Coupling.—W. Van Valkenburgh Smithville, N. Y.

I claim, First, The arrangement of the springs, I J, rod, G, springs, E, pivoted draw head, B, and spring, L, in combination with the frame of the car, substantially in the manner and for the purpose herein described.

Second, The pivoted draw head, B, and spring, L, operating in combination with the curved catch, Q, and sliding frame, M, constructed and arranged in the manner and for the purpose specified.

Third, The combination and arrangement of the pivoted draw head, B, spring, L, springs, I J, spring, E, sliding rod, C, sliding frame, M, link, N, and lever, O P, constructed and operating substantially as and for the purpose herein represented and described.

56,838.—Nail Hammers.—W. G. Ward, Savona, N. Y.

I claim holding the nail by means of the groove in the hammer, in combination with the head block and spring, when constructed to operate substantially as described and for the purpose set forth.

56,839.—Corn Planter.—David R. Warfield, Muscatine, Iowa.

First, I claim constructing the driving wheel, G, with spurs, I, when used in combination with the cams, H H, and levers, R R, for actuating the sliding seed valve of a corn planter, substantially as set forth.

Second, In combination with the spurs, I, the plates, E, arranged substantially as and for the purposes set forth.

Third, The combination of the wheel, G, and spurs, I, and frame, A, with the frame, B, and seat, L, substantially as and for the purpose set forth.

Fourth, In combination with the wheel, G, and spurs, I, the track clearer, Q, substantially as and for the purposes set forth.

Fifth, The levers, R R, in combination with the supports, N, and lever, P, substantially as and for the purposes set forth.

56,840.—Tool and Rest Holder for Lathes.—James Wolfenden, Jersey City, N. J.

I claim the combination of the slotted plate, B, tool holders, C, with segmental threads gearing in scroll, D, and plate, A, provided with the adjustable guide slides, E, when arranged and operating in the manner and for the purpose herein described. Also the segmental slots, a, in the bracket, B, for the purpose set forth.

56,841.—Slide Valve.—A. H. Woodruff, Lansing, Iowa.

First, I claim the angular valve, either double acting or single acting, in combination with a correspondingly angular seat, substantially as and for the purpose described.

Second, The recesses, f f, in the exhaust side of the valve seat, in combination with the angular valve, substantially as and for the purpose set forth.

Third, The recesses, e e', in the steam side of the valve seat, in combination with the angular valve, substantially as and for the purpose set forth.

56,842.—Furnace for Desulphurizing Ores.—Thomas D. Worrall, Central City, Col. Ter.

I claim, first, In a desulphurizing furnace, used in combination with a steam engine, to operate a blower or quartz pulverizer, or both, so combining and arranging the steam generating furnace with the desulphurizing furnace, that the flame and other products of combustion escaping from the steam generating furnace shall pass into and through the desulphurizing furnace and supply the flame and heat necessary for effecting desulphurization therein, substantially as described.

Second, I claim condensing flame by means of a blow pipe or pipes upon a hearth over which pulverized quartz is passed for the purpose of desulphurizing the same, substantially as described.

Third, I claim, in combination with a hearth upon which flame is condensed by means of a blow pipe or pipes, for the purpose herein described, a fan blower air pump, or other suitable air generator, for the purpose of forcing air through said blow pipe or pipes to condense the flame upon the hearth, substantially as described.

Fourth, I claim an inclined or zig-zag flue, with top of soapstone, metal, or other suitable substance, for the purpose of securing a heated surface over which pulverized quartz is passed, for the purpose set forth.

Fifth, I claim the horizontal flue, I, with top plate of soap-stone, metal, or other suitable substance, in combination with the stirrer or scraper, L, for the purpose described.

Sixth, I claim the hopper, B, in combination with the worm screw, L', and the stirrer or scraper, L, substantially as and for the purpose described.

Seventh, I claim the hopper, B, in combination with the flue, J J, under the same for the purpose of drying and heating the pulverized quartz before leaving the hopper.

Eighth, In combination with the stirrer or scraper, L, and the horizontal flue, I, I claim the apertures, O (one or more) through both the top and bottom plates of said flue, for the purpose of delivering the pulverized quartz down upon the heated plate covering the inclined flue, H, substantially as and for the purpose set forth.

Ninth, In combination with the hearth, G, I claim the sluice or watercourse, W W, for the purpose of conveying the pulverized quartz from said hearth to a beddle, arasta, or shaking table, as described.

56,843.—Apparatus for the Manufacture of Gas from Petroleum.—William C. Wren and William Barker, Brooklyn, N. Y.

We claim the process herein described of producing gas, to wit: by a combination of one or more heaters and super-heaters (not less than one of each) continuously connected with each other by pipes, such heaters and super-heaters fitted and filled as described in the foregoing specification, and by the peculiar combination, arrangement, and graduation of two or more fires, not less than two, as shown in specification, with an addition of more heaters, super-heaters, and fires, as the quantity of gas to be produced may require.

56,844.—Spring Bed Bottom.—J. E. Wilsey, Chicago, Ill., and D. Forbes, Scotland, Great Britain.

We claim the end rails, B B, in combination with upper and lower frames, and the notched crossed slats, F F, in combination with spiral springs, G G, the whole arranged substantially as above described and specified.

56,845.—Egg Beater.—Leonard B. Alden (assignor to John Walker), Cincinnati, Ohio.

I claim the combination of the plate, D, lever, L, rack, K, pinion, I, shaft, G, and lug, F, all constructed and arranged to operate substantially as and for the purposes set forth.

56,846.—Breech-loading Fire-arm.—A. M. Bacon (assignor to himself and George E. H. Day), Washington, D. C.

I claim the oscillating chambered breech block plunger and magazine combined, as constructed and arranged with the hammer operating against the rear end of the chamber, and the mode of oscillating the same by the diagonally grooved wheel, as described.

56,847.—Brick Machine.—E. P. H. Capron and J. F. Winchell (assignors to themselves and T. W. & H. J. Miller), Springfield, Ohio.

We claim, first, The combination of the tubes, H, and plungers, B', operated by the oscillating arm, m, substantially as shown and described.

Second, The division box, D, with the adjustable mouthpiece, e, as set forth.

Third, The combination and arrangement of the endless bolts, L, with the tubes, H, for receiving and conveying the strip of clay, as set forth.

Fourth, The combination of the mold box, E, and followers, F, when connected by means of the bolts, b, and springs, d, and otherwise arranged to operate as shown and described.

Fifth, We claim the use of the set screws, O, or their equivalents when arranged substantially as described for the purpose of adjusting or regulating the pressure on the brick, as set forth.

Sixth, We claim providing the molds with the groove x, and oil cup, e', as set forth.

Seventh, The sliding frame, h, arranged to operate as described, for the purpose of delivering the brick from the machine, as set forth.

Eighth, We claim the combination of the cam wheel, K, lever, I, and the plunger stems, a' and d, for the purpose of giving to the mold, E, and the follower, F, the movements herein described.

Ninth, We claim a brick presser or follower having cloth secured to its face by means of the band, y, fitting in a recess formed therein, as shown and described.

56,848.—Water Wheel.—J. D. Chase, Denison Chase, and Jefferson Chase (assignors to themselves and and Daniel Pomeroy), Orange, Mass.

We claim, first, The construction of the buckets, H H, as arranged in relation to the central hub and inclosing cylinder, substantially as and for the purpose herein specified.

Second, We also claim the extension of the upper edges of the buckets, H H, upward within the conical part, a, of the curb, A, in combination therewith, substantially as and for the purpose set forth.

Third, We also claim the combined arrangement of the bridge tree, I, adjustable as described in the chairs, M M, and the inclosing curb cylinder, G, and the wheel therein, substantially as and for the purpose herein specified.

56,849.—Rod Coupling.—David Daltry (assignor to himself and John Parker), Philadelphia, Pa. Antedated July 13, 1866.

I claim the combination of the tapering enlargements a a', of the two tubes, the clamp pieces, C and C', and the sleeve, D, the whole being constructed substantially as and for the purpose specified.

56,850.—Rotary Pump.—Rollin Defrees (assignor to self and John D. Defrees), Washington, D. C.

I claim, first, The induction and eduction ports through the rotating cylinder which carries the sliding vane by means of which the water enters and departs from the pump chamber, in a direct vertical line through said rotating cylinder, substantially as described.

Second, Forming the top and bottom of the pump chamber by means of the plates or disks, o o and m m, recessed for packing as described.

Third, Opening and closing the ports by means of the sliding vane, substantially as described.

Fourth, The water passages, l l, through the vane, whereby the pressure of the column of water in the well tube is admitted behind the vane to equalise the pressure of the water on the inner and outer sides of said vane, and obviate resistance to the action of the spring.

56,851.—Horse Hay Fork.—James B. Drake (assignor to Drake, Sill & Hutson), Picture Rocks, Pa.

I claim, First, The combination with the adjustable parallel bars, A A', of the stationary cutter, B, and pivoted cutter, B', all arranged to operate substantially as described.

Second, The adjustable cutter, B', formed with a circular cutting edge, b,' and lifting points, 2, substantially as described.

Third, In combination with the above, I claim the bar, C, pivoted to the bars, A A', and provided with studs to enable the said bar, C, to be operated by a cord or otherwise.

Fourth, In a hay fork and knife constructed as herein described, I claim the latch, F, and stop, G, or their equivalent, for the purpose set forth.

56,852.—Apparatus for Distilling Petroleum.—M. P. Ewing (assignor through mesne assignments to H. B. Everett and P. Ewing), Rochester, N. Y.

I claim, First, The combination of a continuous feed with a vacuum still for petroleum, operating substantially as and for the purpose herein set forth.

Second, The combination of a jet condenser with a vacuum still for petroleum, operating substantially in the manner and for the purpose herein specified.

Third, The combination of the two or more condensers, H H, with each other and a vacuum still, A, in such a manner that the action may be alternated from one to another to preserve the vacuum, and to allow the constant running of the still, as set forth.

Fourth, The arrangement as a whole, consisting of the retort, A, condensers, H H, connected by the tubes, G G, and pipes, I L', operating substantially as and for the purpose specified.

56,853.—Sleeping Car.—Ben Field, Albion, N. Y. assignor to himself and Geo. Pullman, Chicago, Ill.

First, In combination with the couches of a convertible sleeping car, I claim the hinged board, B, when attached to the back of a seat, and capable of being adjusted substantially in the manner and for the purpose set forth.

Second, In combination with the upper couch, C, I claim one or more intermediate pieces, G, connecting the head and foot pieces, F F', and the partitions, E, substantially in the manner and for the purposes set forth.

56,854.—Fastening Paper Collars.—S. Hodgins (assignor to himself and Stephen Blackie), St. Louis, Mo.

I claim in elastic strip provided with one or more button holes, and one or more hooks when arranged in relation to a paper collar, substantially as described.

56,855.—Life Boat.—William Hughes (assignor to himself and John Fieldstad), Waupun, Wis.

I claim a boat having the two chambers, A and B, on each side, the former being a water chamber open at bottom, a, and at top, a', as also the latter being an air chamber open at bottom, a'', the two having a partition, C, between them, arranged, constructed and cooperating in the manner described, and for the purpose set forth.

56,856.—Covering for Steam Pipes and Boilers.—E. C. Little (assignor to Eveline Little), St. Louis, Mo.

I claim covering steam pipes and boilers with a coating of plaster of Paris cement, with or without a rapping of canvas, for the purpose of retaining the heat and preventing its loss by radiation in the manner herein described.

56,857.—Fishing Line Sinker.—John R. Martin, Boothbay, Me., assignor to Samuel K. Hilton, Portland, Me.

I claim the movable staple, bolt, or slide, inserted in the top of the sinker beneath the plate with a mouth or space for the admission of a swivel or line which is opened or closed at pleasure as described above, by means of which the sinker is readily detached from the line.

Also the connection of a plate of hard metal with a body of soft metal, each of which is made separate as well as the movable staple, and either of which may be supplied anew at pleasure.

56,858.—Apparatus for Buoying Vessels.—Thomas Cato McKeen, Irvington, N. J.

I claim the use and application of the air reservoir or receiver, A, in combination with the bags or buoys, F, whether connected together directly by the use of pipes, or by the use of intermediate main, C, and the method of constructing the air receiver the buoys and netting, and of inflating the buoys by means of compressed air; the application to and use with the buoys of the common self-acting safety valve, made to yield or discharge at a certain pressure; and the application and use of the hole and its head to and with the buoys, the whole arranged and operating substantially in the manner and for the purposes above set forth

56,859.—Broom Head.—Wm. A. Middleton (assignor to himself, David J. Brougher and G. H. Hammer), Harrisburg, Pa.

I claim, First, The skeleton, B, in combination with the clips, C, and handle, A, when said parts are arranged as set forth.

Second, In combination with the metallic frame, I claim the application of cement, substantially as set forth, for the purpose of securing the brush in place.

56,860.—Bleaching Palm, Straw, etc.—Franklin Perrin, Cambridge, Mass. assignor to himself and D. C. Perrin, Boston, Mass.

I claim the improvement in bleaching palm leaf, cane, straw and similar fibrous bodies, substantially as described.

56,861.—Coffee Roaster.—Paschal Plant (assignor to himself and Peter Hannay), Washington, D. C.

I claim the cylinder, A and B, either singly or combined, when used in combination with wire gauze or perforated plate, E E, and openings, a a a, arranged in the manner substantially as and for the purpose set forth.

56,862.—Machine for Smoothing Ivory Key Board.—Milon Pratt (assignor to himself and Clemens Darnstaedt), Meriden, Conn.

I claim the combination of the reciprocating bed, B, adapted for the securing upon it of ivory key pieces, rotary head, C, provided with cutters, a a, arranged obliquely in pairs, and the guide ways, A, all constructed, arranged, and employed as specified, for smoothing off the ivory surface of key board.

56,863.—Process for Purifying and Deodorizing Whisky.—E. F. Prentiss and R. A. Robertson, Philadelphia, Pa. (the latter assigns his right to W. D. Philbrick and W. J. Parsons.)

We claim the process of purifying and deodorizing alcoholic liquids by passing them, while in a vaporous state, through the interstices of a porous, perforated, cellular, granulated, or otherwise finely divided neutral material, kept wet with a solution of alkali, or of alkaline salts, or of the substances having an equivalent purifying action, in the manner and for the purposes substantially as described.

56,864.—Apparatus for Purifying and Deodorizing Whisky.—E. F. Prentiss and R. A. Robertson, Philadelphia, Pa. (the latter assigns his right to W. D. Philbrick and W. J. Parsons).

We claim the trap tubes, E, or their equivalents, in combination with the neutral material, K, contained in one or more drawers or cases, in the manner and for the purpose substantially as shown and described, the whole being used in connection with a still, for the purposes herein set forth.

56,865.—Clothes Wringer.—Hiram Robbins (assignor to himself and Thomas H. Foulds), Cincinnati, Ohio.

I claim, First, The reversible, scolloped, and counter-sunk spring, O P P' Q Q', in the described combination with the perforated and slotted posts, A B, beam, D, relaxing screw, E, upper roll, J, and rods, M M'.

Second, I claim, in combination with the above, the spring, N, interposed between the two pressure rods, M and M'.

Third, I claim the combination of the spring washer or cushion, S, the beam, D, and the head of the screw, E.

56,866.—Car Coupling.—W. E. Tickler, E. T. Marshall, and Daniel M. Marshall, Pierceton, Ind.

We claim the rising and falling pin, D, connected with a sliding frame composed of the rods, B B, and car, C, in combination with bar, D' and F, the former being provided with a weight, G, and both connected with a shaft, E, the sliding bar, J, connected with a pendent frame, I, on shaft, E, and the plate, K, all arranged to operate substantially in the manner as and for the purpose set forth.

56,867.—Fire Kindling.—William F. Wenisch, New York City, assignor to himself and John Wenisch, Newtown, N. Y.

I claim a composition for kindling wood or coal fires, formed by combining rosin, dry saw dust, and dry sand with each other in the proportions and in the manner substantially as herein described and for the purpose set forth.

56,868.—Machine for Drying and Cleansing Grain, etc.—August Tonnar, Prussia, Germany, assignor to Sigismund, Drey & Moritz Rosenheim, New York City.

I claim, First, The conical perforated agitators, J, constructed substantially as specified, in combination with the centrifugal disks, K, and hot air pipe, L, for the purposes, and as specified.

Second, I claim the arrangement of the chute, S, and valve, h

in combination with the chute, D, and conical agitators, for the purpose, and as set forth.

56,869.—MACHINERY FOR SWAGING THE HEADS OF SCREW AUGERS.—Russell Jennings, Deep River, Conn.

I claim, First, The operating of the heading die, by the rotating shaft, B, through the mediums of the loose driving wheel, E, provided with the pins, g, the sliding wheel, F, placed on a square shaft, B, and provided with projection, i, beveled at one end, in connection with the sliding rod, H, and the fixed inclined lip, s', all arranged to operate, substantially as set forth.

Second, The forming die, consisting of the portions, 11' D, constructed and operating substantially as described.

Third, The combination of the heading die, D, mold or female die, L, toggle, M, and driving or operating mechanism so arranged that the driving shaft, B, may at the will of the operator be connected with and disconnected from the continually rotating driving wheel, E, substantially as described.

56,870.—DISINFECTING COMMODE.—H. J. Alvord, Detroit, Mich.

I claim the arrangement and combination of the pans, D and E, perforated annular flange, C, and cover, F, with the bucket or casing, A, or their equivalents, substantially as and for the purposes described.

REISSUES.

2,823.—CLOTH GUIDE FOR SEWING MACHINE.—George F. Clemons, Springfield, Mass. Patented June 27, 1865.

First, I claim in a sewing machine a cloth guide adapted to give adjustably variable pressure upon the material being sewed, for the purpose specified.

Second, In combination with a cloth gage upon a sewing machine, I claim a spring pressure plate presenting a smooth bearing surface upon the material being sewed, and having means for an adjustment of the pressure for guiding the same toward the gage face, and for distribution of its pressure upon the material, substantially as and for the purposes set forth.

Third, Regulating the pressure of the guide plate by means of the auxiliary plate, H, arranged and operating substantially as and for the purposes specified.

Fourth, The combination of the spring plate, E, and pressure plate, H, with the cloth gage, C, in the manner and for the purposes shown and described.

Fifth, The combination of the spring plate, E, and pressure plate, H, with the gage plate, C', pivoted to the shank, G, substantially as and for the purposes set forth and shown.

Sixth, The combination of the pivoted gage plate, C', and gage shank, G, arranged and operating substantially as and for the purposes specified.

2,824.—MACHINE FOR MAKING NUTS.—George Dunham, Unionville, Conn. Patented June 27, 1865.

First, I claim constructing and arranging the sizing bar, O, so as to act in the three-fold capacity of sizing, holding, or gaging, actuated by proper mechanism, substantially as and for the purpose described.

Second, I claim the combination of the conical-shaped recess, Q, with the spring or yielding table, P, substantially as and for the purpose described.

Third, I claim the combination of the shearing punch, L', with the conical recess, Q, substantially as and for the purpose described.

Fourth, I claim the employment of the lifting holder, S, S', substantially in the manner and for the purpose described.

Fifth, I claim the employment of the hammers, K1 and K2, or their equivalents, in combination with the holders, S S, substantially as and for the purpose described.

Sixth, I claim the clearer bar, N, for holding, clearing, and carrying the nut from one point to another, substantially as described.

Seventh, I claim the screw upon the upper end of the punch, K, in combination with the threaded socket, I, substantially as described.

Eighth, I claim a machine constructed substantially as described for cutting the blank forming the basil, and hammering or finishing the edges of a nut before the punching of the hole, substantially as described.

2,825.—HOISTING APPARATUS.—John Semman, Cincinnati, Ohio. Patented July 17, 1860.

I claim the arrangement of the pulleys, K V R, belt, L, rectangular frame, B C D, pulley, M, shaft, N, and operating in the manner and for the purpose herein specified.

Second, I claim the system of gearing, composed of gear wheels, G G, worm wheels, H H, worms, I I, and racks, P P, all arranged and operating substantially as and for the purpose described.

Third, I claim in hoisting machines the use of two worms on one shaft, the one right hand and the other left, each gearing into an appropriate worm wheel, and each furnishing a step for the other, substantially as shown and described.

Fourth, I claim in power hoisting machine the attaching to and carrying the climbing machinery with the platform, the power for operating the same not being located on the platform, in the manner herein described.

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The utility and simplicity of this scaffolding, and the safety and ease with which it is adjusted, recommends it to all who have occasion to use the article. State, County, or Single Rights for sale low. Address HORACE LITTLEFIELD,
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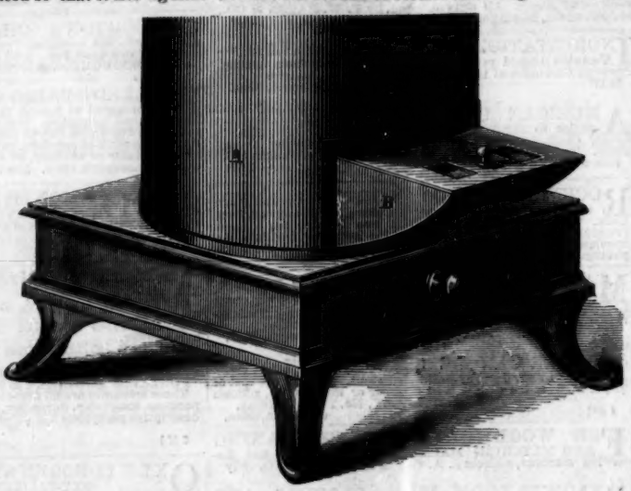
Improved Stove Attachment.

This engraving illustrates an invention designed to save fuel and do away with the inconvenience of emptying stoves to rekindle a fire in them.

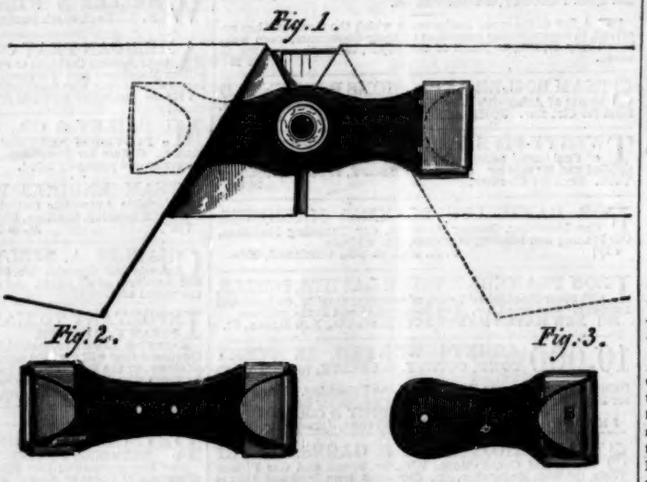
In the engraving, A represents a stove, and B the attachment. It consists of an iron box, C, in which the kindling wood is placed so that it lies against the fuel, and the flame from it will play against the same and ignite it, and thus obviate the trouble alluded to. It is well known that large quantities of fuel are annually wasted in the form of cinders which might be turned to account if people were not too lazy to sift the ashes. The invention is designed to obviate even this trouble, for, by thoroughly raking the principal grate, so that all the ashes are thrown out, what remains will ignite readily, the clinker in good coal being but a small part of the whole. A patent is now pending on this invention through the Scientific American Patent Agency, by J. W. Elliott. For further information address him at Toronto, C. W., Box 556.



ELLIOTT'S STOVE ATTACHMENT.

Improved Collar Fastening.

To many persons, especially those of a nervous temperament, the usual method of fastening collars is a great discomfort. Even when it is of the right length, there is a sense of constriction or tightness that induces frequent pulling, twitching, and stretching to remove the trouble. With paper collars, now so popular, it is not uncommon for the ends to tear out in the act of buttoning, they being unable to stretch sufficiently to make the wearer comfortable. These troubles are avoided by using an elastic fastening like that shown in the engraving. It is a rubber band, A, provided with metallic hooks, B, which are to be inserted in slits in the ends of the collar. The bands have button-holes in them which fasten over the button on the shirt in a manner readily understood. Fig. 2 shows a single band with double ends, having but one button-hole; in this case the hook must be loosened from one side of the collar before the same can be taken off the neck. It is claimed that this mode of fastening a collar is much more comfortable and economical in point of wear and tear than the usual one.



HODGINS'S COLLAR FASTENING.

A patent is ordered to issue through the Scientific American Patent Agency to S. Hodgins. For further information address him at No. 408 North Third street, St. Louis, Mo.

THE GREAT ORGAN AT PLYMOUTH CHURCH.

For eighteen months past the establishment of E. & G. G. Hook, of Boston, has been engaged in building an immense organ for the church of Rev. Henry Ward Beecher, in Brooklyn, and on the evening of the 27th ult. it was first exhibited to a few invited guests. It is the largest organ ever built in this country, containing 3,442 pipes and costing $25,000.

It occupies, with its attendant machinery for filling the bellows, a portion of the building extending from the floor of the sub-basement to the ceiling of the auditorium, which had to be raised to accommodate the instrument. From the gallery floor it occupies a space of 28 feet 5 inches wide by 22 feet 4½ inches deep, and a hight of 31 feet 7 inches. The external appearance is imposing. The style of the architecture is what is known as the Romanesque. Four handsome columns support a pediment, the apex of which is broken to receive the image of an angel, which serves as a symbol of music. The ornamental pipes in front are not, as is usual, gilt, but silvered. They are made of block tin, and contrast effectively with the wood-work of the case, which is of black walnut. At the ends of the pediment, at the top of the case are a cluster of silvered trumpets, nine in number, at each side, diverging from a common center at an angle of about forty-five degrees. The extreme upper corners of the instrument are finished by massive urns.

The instrument has four manuals of fifty-eight keys each. The pedal has thirty-eight. These manuals can be played together or separate, and the Messrs. Hook have applied pneumatic levers, connected with auxiliary bellows, to equalize and overcome the resistance, which is so wearisome to the player when the manuals are united. The movement for regulating the volume of sound without the aid of the stops is exceedingly simple and effectual. It is done by the feet of the performer, who can slide a movable carriage and increase or diminish the volume at pleasure. It makes an admirable crescendo attachment.

There are four bellows, with a capacity of 500 cubic feet. They are worked by hydraulic engines of six inches bore with twelve inches stroke. They are fed by water pipes from the street mains, and work automatically, the supply of water being governed by the state of the bellows, with which the valves are directly connected, so that if one bellows is nearly exhausted, the engine connected with that works rapidly until it is filled, when it diminishes in speed. A hand wheel, connected with the water gate, is at the side of the organist, with bellows gages and a water gage, so that the starting and stopping of the engines, the pressure of water, and the state of the bellows, are at all times under the control and observation of the player. This is a new feature as applied to organs in this country, and a patent is now pending for the improvement through the Scientific American Patent Agency.

The power of the instrument, as exhibited at the time mentioned, was wonderful. The crash of sound when the full organ is used, and especially the "Tuba Mirabilis," referred to as the exposed trumpets, is absolutely startling. At the same time the tones of some of the stops, as the "Doppel Flote," the "Flute Harmonique," the "Vox Angelica," and the "Vox Humana," are indescribably soft, soothing, and pleasing. It is a magnificent instrument, and will be an additional attraction to this popular place of worship and a monument of American taste and ingenuity.

Primitive Beehive.

The following mode of keeping bees has been practiced in India for a long period, and is said to be very successful:—

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In ascending into the air, the heart-beats increase 5 for the first 3,000 feet, 7 more for the next 1,500 feet, 8 for the next 1,500, and 5 for each 1,500 feet of ascent after that. This is an average increase of one beat for each 100 yards of ascent.

MECHANICS

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